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STATE OF NEW YORK.

ONE HUNDRED AND TWENTY-SEVENTH SESSION.

1904.

VOL. VII.—NOS. 11 TO 20, INCLUSIVE.

ALBANY
OLIVER A. QUAYLE
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FOURTH ANNUAL REPORT

OF THE WORK OF THE

CANCER LABORATORY

OF THE

New York State Board of Health

Conducted at the
GRATWICK RESEARCH LABORATORY
University of Buffalo

For the Year 1902-3

TRANSMITTED TO THE LEGISLATURE JANUARY 6, 1904

ALBANY
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REPORT OF THE DIRECTOR.

Buffalo, N. Y., *February* 1, 1903.

Dr. Daniel Lewis, *State Commissioner of Health, Albany, N. Y.:*

Sir.—I have the honor herewith to transmit my own report as executive head of the State Cancer Laboratory, and those of my colleagues, pertaining to the work done there during the past year. The staff of the Laboratory at present consists of the following:

Dr. Harvey R. Gaylord	Pathologist.
Dr. H. G. Matzinger	Bacteriologist.
Dr. G. H. A. Clowes	Chemist.
Prof. Gary N. Calkins	Consulting Biologist.
Alice G. Owen	Assistant.
F. S. Low	Assistant in Photo-chemistry.
E. W. Jeffcott	Assistant Chemist.
Clara A. Maclay	Secretary.
F. A. Payne	Janitor.
Fred Tepe	Laborer.
M. Weber	Laborer.

Expenses of Conducting the Laboratory for the Period from February 1, 1901, *to September* 30, 1902.

1901.	Equipment.	Stock and material.	Sundry expense.	Salaries.	Total.
February	$241 35	$56 04	$64 95	$806 66	$1,169 00
March	33 80	73 86	39 13	786 66	933 45
April	105 55	77 70	96 67	861 66	1,141 58
May	48 50	72 77	104 58	841 66	1,067 51
June	....	....	....	841 66	841 66
July	84 10	118 21	59 42	528 32	790 05
August	7 16	26 71	62 81	333 33	430 01
September	....	....	....	333 33	333 33
October	53 25	39 57	18 53	1,141 33	1,252 68
November	1 68	24 51	23 50	736 66	786 35
December	46 34	31 73	190 27	676 66	945 00
1902.					
January	2 06	19 41	84 23	676 66	782 36
February	....	16 21	203 07	736 66	955 94
March	333 42	76 29	119 89	746 66	1,276 26
April	80 36	240 20	126 31	878 36	1,325 23
May	103 55	60 63	213 29	869 99	1,247 46
June	90 93	83 68	131 45	869 99	1,176 05
July	488 51	59 54	132 75	786 66	1,467 46
August	3 35	27 35	272 82	786 66	1,090 18
September	165 76	245 12	248 82	553 33	1,213 03
	$1,889 67	$1,349 53	$2,192 49	$14,792 90	$20,224 59

It will be noticed that this period covers twenty months, and that the entire expense for this time has been $20,224.59.

The bills for each month are audited separately by myself, are sent to you for your revision, and then go to the Governor for his signature before the Comptroller remits the amount required.

The deaths from cancer in New York State for the year ending December 1, 1902, as taken from the Bulletin of the State Department of Health, have numbered 4,984. Taken by months the statement is as follows:

Deaths from Cancer in New York State Year Ending December 1, 1902.

December, 1901	442
January, 1902	384
February, 1902,	375
March, 1902	406
April, 1902	439
May, 1902	501
June, 1902	411
July, 1902	434
August, 1902	443
September, 1902	314
October, 1902	416
November, 1902	419
	4,984

The reports of Drs. Gaylord, Calkins, Clowes, Matzinger and Lyon, herewith transmitted, will be an excellent indication of the character and the amount of work done under State auspices in this institution. A very brief outline of the general character of the work may not be amiss, and would be as follows: During the past months work has been done upon the yeasts, which we for a long time suspected to be actual parasites of cancer, until the subject was fairly exhausted and these suspicions considered to be unfounded.

This work was done with various cultures of yeast and with serums, and was followed out until it appeared that yeasts were not concerned, at least in the production of cancer. Since then attention has been given mainly to the protozoa, which are now the subjects of a very extended and searching inquiry. This is particularly true of the Plasmodiophoræ. These are known to produce tumor formation in plants, and there is constantly increasing evidence that they or some allied protozoan forms are concerned in the production of cancer. Dr. Matzinger, who has not made a separate report, has cooperated with Drs. Gaylord and Clowes in working with this organism. A very suggestive paper by Professor Calkins is also included.

Our work at present is conducted along three principal lines and in three laboratories—the pathological, the chemical, and the bacteriological—using this last term in its broader sense and meaning thereby that bacteriological methods are being applied, so far as they are applicable, to the study of other minute forms of life. That this work may go on to best advantage there must be the heartiest cooperation between these various departments, while methods and results are so dovetailed, so to speak, that it is impossible to say that the head of one department can concern himself with one solitary phase of the subject. I am glad to be able to say that this correlation of the work goes on here in the best of spirit and with the happiest of results, and that it seems to be leading up to discoveries of value and the establishment of facts of the greatest importance.

In a general way I may say that the principal work now carried on in the chemical laboratory relates to metabolism in its broadest possible sense—from that in the individual cell to that in the body at large—with a view of discovering if possible the nature of the perverted metabolism now so generally recognized in connection with cancerous disease. So much, however, has to be established more definitely regarding these changes under normal conditions before we attempt to estimate the abnormal that the work necessarily makes slow progress. In fact it is true of all the work done in this Laboratory that we have had to deal with such novel or hitherto unsolved problems on every hand that it has taken a great deal of time to be able to approach them with any definite amount of fundamental knowledge.

This is particularly true with regard to the protozoa. There is not a practicing physician in the United States who has anything more than a rudimentary knowledge of this subject, and yet the question of cancer has become more and more a biological problem. Being thus confronted with questions of the greatest medical interest which yet could not be at present solved by medical men as such, we have added to our corps, with your approbation, Prof. Gary N. Calkins of Columbia College, who joins us as consulting biologist. He is certainly the best qualified authority on the subjects which here most interest us to be found in this country, and we look for large benefit to accrue from his advice and experience.

The publication in our last annual report, and elsewhere, of Dr. Gaylord's researches aroused, as was to be expected, considerable criticism from various directions, most of all from those least conversant with the subject. Dr. Gaylord spent some weeks last fall in Europe (without extra expense to the Laboratory) in comparing results with those of the most eminent European workers in this direction. While each reader of his present report will gather therefrom that the statements previously made have to be but little, if at all altered to accord with the present state of our progress, it is with pleasure that I assure you that from various sources, public and private, I find that the sentiment is everywhere growing that this work is conducted on proper lines, and that its results as already published constitute a very distinct advance and give very great promise. Were this the place in which to become controversial one might easily go into an animated discussion and point out the baseless character of most of the criticisms which have been directed at it. I feel, however, that it is at least due to all concerned to say that the views enunciated in our previous reports have become more and more widely accepted and corroborated.

An important part of our work is also the critical study and condensation of the special literature bearing upon it. We are gathering a library of such literature as fast as our means will permit, and we endeavor to let nothing of importance in the world's literature pass unnoticed. You will readily see that in this effort alone not a little time has to be expended.

A very important part of our work during the past year has been the effort to determine something of the real value of the Roentgen or X-rays in the treatment of cancer. Generous friends of the Laboratory have contributed an exceedingly elaborate outfit for this purpose which has been set up in the Buffalo General Hospital and is in almost constant use there. To this feature of the subject I have mainly devoted myself. I feel that this is hardly the time or place in which to write an elaborate paper on this subject. The medical journals of late have been full of such papers and the topic has quite lost its novelty, but what has been needed in my estimation is a prolonged study based on a large number of cases and watched for a sufficient length of time in order that one's judgment may be ripened and his expressions on the subject thereby made of value. Recently a large Finsen light apparatus has been added to our hospital equipment, and I am now experimenting with a more portable apparatus for applying the ultra-violet rays for this same purpose. With this I have as yet had too little experience to justify any statement whatever, although the reports which come to us of its use abroad are mostly favorable; but with regard to the X-rays, I am quite prepared to say that in certain cases and within certain limits they offer the most helpful means for relief of pain and favorably influencing or retarding malignant growths that we at present are familiar with.

I do not mean by this to report to you that X-rays will certainly cure any kind of cancer, but I am willing to go so far as to say that certain varieties of superficial cancer have been apparently cured, and that in many instances remarkable relief has been afforded and remarkable changes witnessed. A spirit of conservatism, which I am sure you will consider wise, should prevent any more optimistic statement than this at present. It is proposed to continue these clinical investigations, upon which a more detailed report may be expected later.

The needs of our Laboratory for the ensuing fiscal year are not essentially different than those of the past. We certainly need every person now connected with the staff in order that the work may go on, and the expenses bid fair to be about the same as before. I would like to renew the statements previously made—that the State is saved all expense in this investigation save the actual outlay of its conduct, since the University of Buffalo, through the generosity of Mrs. Gratwick and of other friends, has provided the building and most of the equipment. Consequently there is no rent to be paid.

It is an important part of our work that we should feel at liberty to employ special talent for any special line of investigation which may seem to promise an adequate return. I do not feel therefore that it would be just to ourselves and the importance of the work we are doing to ask for anything less than $15,000 for the ensuing year; i. e., the same amount which we have had previously at our command.

In conclusion I want to express our appreciation of the uniform courtesy and sympathy with which our efforts have been received by yourself and by those in authority. From yourself and from my colleagues in the Laboratory I have had always the kindest assistance and the heartiest cooperation, and I am glad at this time and in this place to record that fact and to express my grateful appreciation thereof.

ROSWELL PARK.

February 1, 1903.

ON THE PRESENT STATUS OF THE INVESTIGATION INTO THE ETIOLOGY OF CANCER BY THE CANCER LABORATORY OF THE NEW YORK STATE BOARD OF HEALTH, UNIVERSITY OF BUFFALO.

By Harvey R. Gaylord, M. D.

In the third annual report from this Laboratory the writer published a series of experimental investigations and observations which led to the conclusion that there was strong evidence of the presence of an organism in carcinomatous material. The first reference made to experiments which indicated the presence of an organism was in January, 1899, before the Medical Society of the State of New York in Albany. The suspected organisms were first observed in peritoneal fluid, where they appeared as hyaline, pale yellowish-green bodies, varying in size from slightly larger than a micrococcus to a size nearly as large as a red blood corpuscle. The smaller forms of these bodies were without structure. In the larger the suggestion of a nucleus was present. The observer incubated an uncontaminated preparation and observed the same field at repeated intervals for a period of four weeks. During this period certain of the smaller forms which were definitely located were observed to increase in size, ultimately develop what appeared to be a capsule, and terminate by dividing into numbers of small, hyaline bodies, closely resembling the original appearance. A portion of the peritoneal fluid thus obtained was injected into guinea pigs. One of these after a short period was killed and multiple nodules which, on microscopic examination, appeared to be rapidly growing adenomata or adenocarcinomata, were found in the lungs. Attempts to stain the hyaline bodies were unsuccessful until a method of pouring the peritoneal fluid into Hermann's fluid was employed, when it was found that they could be stained with a nuclear stain (iron hæmatoxylin).

These bodies were treated with osmic acid and a large proportion of them were found to resist the blackening of osmic. Peritoneal fluid, cancer mush, dried and undried lymph nodes, were injected into animals and large numbers of similar hyaline bodies were detected in the peritoneal fluid of the animals, in the circulation, and in hardened sections of the enlarged lymph nodes. From the suggestion obtained by the appearance of hyaline bodies in the blood of inoculated animals the observer examined the blood in living cachectic cancer patients and detected the presence of small, actively moving amœboid bodies, which were compared with those observed by Pfeiffer and Reed in vaccine and variola, and which, the writer was inclined to believe, represented an amœboid form of the organism found in peritoneal fluid and cancer scrapings in man. A comparison was drawn between the appearence of the hyaline bodies and those described in vaccine and the pustules of variola. An investigation of a number of cases of cancer showed the presence within the cells of what are often referred to as " Plimmer's bodies," which have been most accurately described by that author. These bodies were found to be present in a large proportion of all cases investigated. A relation between these bodies and the extra-cellular, hyaline forms found in carcinoma, known as " Russell's bodies," was indicated, as well as the similarity in appearance of the so-called " Plimmer's bodies " and the so-called " vaccine body " obtained by inoculation of the cornea with vaccine. Intra-cellular, hyaline forms somewhat resembling the so-called " Russell body," and likewise resembling certain forms of the vaccine body, were also shown. The supposed resemblance of the so-called " Plimmer's bodies " to yeasts was considered and rejected. A number of animals inoculated with cancerous material died, after a period of time approximating fifty days, with marked cachexia and with enlarged lymph nodes. In the lymph nodes of these animals hyaline forms closely resembling those found in the fresh cancerous material were observed. The development of the cachexia in these animals was compared by the writer to the terminal process of cancer in man.

Our views regarding the possibility of an extra-cellular form of a parasite in cancer have been repeatedly misinterpreted by writers reviewing our statements. It has been stated that our observations must of necessity be incorrect, inasmuch as the nature of the cancerous process is supposed to preclude the possibility of a parasite being present except in some symbiotic relation to the cancerous epithelium. It has at no time been our belief that, if the amœboid bodies described by us represented a phase of the cancer parasite, in this phase the organism could be capable of producing reinfection. From what is known of protozoa, especially what is known of Plasmodiophora Brassicæ in the plant, it is possible for an organism to be capable of infection of specific elements of the economy in one stage of its cycle only, and having passed into a second phase become incapable of reinfection without the interposition of an ectogenous cycle, in most cases in an intermediary host. In this connection a foot-note which we added to our article as it appeared in the report to the Legislature, submitted April 15, 1901, will express our point of view at that time:

> As the editorial comment upon the above paragraph, as it appeared in the *American Journal of the Medical Sciences,* shows evident misinterpretation of the writer's meaning, he has deemed it advisable to give the wording a more specific character. He has carefully avoided any theoretical deductions and has merely recorded observations as they were made in the Laboratory, with the intention of describing all of the experiments in detail in future publications. One evident misinterpretation credits the writer with the belief that cancer is a general and not a local disease. He trusts that those who will reread that portion of the article as it appeared in the *American Journal* will see that no deduction of this sort is warrantable. Cancer unquestionably begins as a local infection of the epithelium and at some stage of the disease, yet undetermined, the organisms apparently find their way into the general circulation, and, as stated above, after death can be found in all the organs of the cadaver. The exact role which the organisms play when in the peripheral blood is naturally undetermined. It is even fair to assume, from what is known of similar organisms, that they are entirely passive. A number of the protozoa which infect the blood of the lower animals produce very slight disturbance, and it is highly probable that the significance in this case is of no greater importance than showing the general distribution of the parasites in the later stages of the disease. It is our belief that the termination of fatal cancer cases bears some relation to the general distribution of the organisms, but we have carefully avoided all speculations as to the significance of the above observations.

Since the publication of our article in the May number of the *American Journal* and in the form of the Third Annual Report of this Laboratory a series of investigations relating to the amœboid form of the blood platelet have appeared, which throw much new light upon the subject of amœboid bodies in the blood of human beings and animals. For this reason it is desirable for us to review the evidence as it stands.

The bodies which we observed were first found in peritoneal fluid in a case of cancer. The description, as given in our previous article, is as follows: "A careful microscopic examination was likewise made of the peritoneal fluid. It was found to contain a few blood corpuscles and some pale, spherical bodies, in size varying from 2 to 10 micromillimeters. They were homogeneous, of a pale, yellowish-green color, and at first were mistaken for fat droplets, although on closer examination their refractive index was seen to be too low.

"When treated with osmic acid they failed to give the black reaction which characterizes fat. Attempts to stain them were partly successful, and it was found that with cover slips fixed by heat, although the bodies were greatly deformed by the process, a certain number of them could be stained with carbol-thionin or the usual aniline dyes. Some of these bodies, though not very numerous, contained granular material which showed marked Brownian movement. The tubes were examined from day to day and we were able to demonstrate that these spherical bodies gradually increased in size, became more indefinite, gradually lost their yellowish-green color. As they increased in size they apparently became more fluid and commonly sent out pseudopods and long projections. Fine, colorless granules appeared in the protoplasm, and in some a delicate nucleus could be made out."

An examination was then made of a number of cases of carcinoma in the last stages, with the result that similar bodies were detected.

"In one case of general carcinosis small amœboid bodies were found in the blood immediately after it was withdrawn from the patient. These conformed very closely in appearance to similar bodies described by Pfeiffer and Reed in the blood of vaccinated children and monkeys. The younger forms of the organism may likewise be found in the peripheral blood of the animals after inoculation with cultures* or carcinomatous material."

---

*The term "culture" is here used to indicate culture in the biological sense. We observed these amœboid bodies increasing in size and passing through what appeared to be a portion of a cycle. Cultivation in the bacteriological sense of a protozoon is, of course, impossible.

On turning to the observations of Reed* referred to, it will be seen that he observed in the blood of vaccinated children, calves and monkeys and in the blood of patients suffering from variola, *first,* granular, amœboid bodies having a diameter about one-third that of a red blood cell. These appeared during the active stage of vaccinia and disappeared with the decline of the local inflammation. A body of like appearance, granulation and size may occasionally be found in the normal blood of monkeys and children. *Second,* pale, amœboid bodies containing a few dark, pigment-like granules are present in the blood from cases of variola and in the blood of the variolated monkey. Bodies of like appearance may occasionally be found in the blood of vaccinated children and monkeys. A nucleus has not been positively made out in any of these bodies.

The above statements, which form the essential part of the conclusions with which Reed closes his investigation, show that he divides his findings into two classes, one of which, those of the first order, being occasionally found in normal blood, and those of the second order having been found only in cases of variola, variolated monkeys and occasionally in vaccinated children and monkeys. The appearance of these different forms is accurately described in his Experiments 11 and 12, as follows:

Experiment XI.—Monkey. Vaccination June 6, 1896. Successful. This animal's blood had been examined daily by two observers from May 22d to June 5th with negative results. There are seen, however, prior to vaccination, from time to time small, roundish bodies having a slightly greenish refraction and no distinctly granular protoplasm. These are in diameter about one-third that of a red cell and possess amœboid movements. Small, short processes are projected which quickly assume the same greenish color as that of the body proper. They are not to be confounded with the granular bodies seen in vaccinia. After vaccination daily examinations are negative till June 12th (sixth day). On this day the granular amœboid bodies appear in the blood in moderate numbers. They are in all respects similar to those described in Experiment V, except that some of them are smaller, having scarcely a diameter of one-sixth that of a red cell, and some have a slightly coarser and darker granulation. Distinct, clear, blunt processes are projected by these bodies into which, as a rule, the granular protoplasm does not flow, though exceptionally this is seen to take place.

---

*Walter D. Reed, M. D., On the appearance of certain amœboid bodies in the blood of vaccinated monkeys (Rhœsus) and children and in the blood from cases of variola. *Journal of Experimental Medicine,* Vol. II, p. 515.

Several of these granular bodies are still amœboid at the expiration of thirty hours. On the 12th day a body unlike any heretofore seen in monkey's blood is found. Its diameter measures one-half that of a red cell, and the body consists of a number of dark granules situated in the midst of a clear protoplasm. This body is rapidly amœboid, its clear periphery continually changing form and sometimes assuming rosette shapes (Plate XL, Figs. 1-9). A few granular bodies are present on the 14th day. Examination on the 15th, 16th and 17th days negative. (Fig. 1-a.)

Experiment XII.—Child, 4 years, white. Vaccination June 23, 1896. Successful. Examination of the blood on the day preceding vaccination is negative. Examination of blood taken thirty minutes after vaccination shows one small, faintly granular body, in diameter one-third that of a red cell, which sends off clear, blunt processes after the manner of the bodies already described in the vaccinated monkey's blood. From this time until the 7th day examinations are negative. On this day there are observed a few pale amœboid bodies, with a diameter one-half that of a red blood cell, containing a few fine, dark, dancing granules and which are slowly amœboid. Similar bodies are observed on the 9th day. Examination on 10th, 11th and 12th days is negative. (Fig. 1-b.)

From this description and the drawings illustrating Experiments 11 and 12 the similarity of the bodies described by us and those found by Reed is apparent.

In Vol. 164, Part 2, of Virchow's Archiv, in an article entitled "Untersuchungen über die Blutplättchen," Deetjen reports the results of a new method for the investigation of the blood platelet. This observer has succeeded by special means in showing that the blood platelets normally found in the blood under certain conditions (placing the fresh blood upon agar films, to every 100 c.c. of which has been added 6 to 8 c.c. of a 10 per cent solution of $NaPO_3$ and 5 c.c. of a 10 per cent solution of K_2HPO_4) increase in size up to forms as large or somewhat larger than a red blood cell and take on active amœboid movement. After fixation with osmic acid vapor and staining with hæmatoxylin, the central portions of these bodies stain more deeply than the periphery. The deeply staining portion at the center is interpreted by Deetjen as a nucleus, and he concludes that the blood plates are therefore definite elements which, under certain conditions, are capable of taking on an amœboid phase.

After first describing the usual degeneration phenomena which blood platelets undergo in blood after withdrawal from the body, he describes the behavior of these elements when placed upon agar films impregnated with the salts above mentioned. In the course of five minutes, in most cases somewhat sooner, or in others later, the blood platelets are found to undergo certain changes. The platelets are first seen in the usual form of round or oval plates and are usually present in considerable numbers. In this stage they are apparently in a state of rest comparable to the spherical form taken on by the leucocyte in the stage of contraction. From this form they gradually become larger and two different substances can be detected within them; a central, highly refractive portion, usually round and of greenish color and an outer, paler protoplasm. The outer protoplasm immediately sends out pseudopodia. These are projected with great rapidity from various portions of the periphery and are either blunt or pointed. In this way the outline of the blood platelet is continually changing. Fig. 2 represents an attempt to indicate the changes in form which a single blood platelet undergoes in less than half a minute. In this case, of course, no attempt has been made to actually draw the changes of form, for when the composition of the agar is most favorable, these changes are altogether too rapid. Frequently the blood platelets are found, during the period in which they are actually projecting pseudopodia, to move slowly about the field. This is without doubt an independent amœboid movement. The smallest forms as well as the largest possess this power to move themselves about.

From the description above given it will be seen that the blood platelets, although closely conforming to the small, granular amœboid bodies of Reed, differ from the second order described by him in the absence of pigment. It is difficult to say as to whether the highly refractive central body which Deetjen holds to be a nucleus and the statement which Reed makes that he has never demonstrated a nucleus, are simply differences of interpretation or represent actual differences in the amœboid bodies in question. In the larger bodies which we have observed in the peritoneal fluid in cases of cancer we have observed a certain condensation of the central portion of the protoplasm which we held to represent a nucleus; but a nucleus, in the sense of nuclei, as we know them in tissue elements, has, of course, never been observed.

After a comparison of our own observations with those of Reed and the more recent results of the investigation of Deetjen one would be inclined to dismiss the entire matter with the belief that both Reed and ourselves had simply observed the amœboid form of the blood platelet. This would be the case, had we not recently become acquainted with the amœboid form of the parasite Plasmodiophora Brassicæ. The swarm spores of this organism are minute masses of protoplasm which, when first liberated from the spore cysts (see Figs. 1 and 2) are homogeneous. They are from 3 to 4 micromillimeters in diameter, but increase in size until they become transformed to typical myxamœbæ.

In the swarming stage these organisms frequently show active amœboid motion, rapidly throwing out and retracting pseudopodia and spine-like projections from the margin of their protoplasm. They frequently contain one or more granules of pigment and a nucleus is not demonstrable. A comparison of the illustrations from Woronin (Fig. 3, Article on Plasmodiophora Brassicæ) will at once show the similarity of this phase of Plasmodiophora to the amœboid bodies in question. The difficulty of fixing and staining this form of Plasmodiophora as well as the lack of success in fixing and staining the amœboid bodies in vaccine and those which we have seen in the peritoneal fluid in cases of cancer, have thus far frustrated any attempt at a more accurate comparison, and until more suitable methods are developed, the entire matter must be left in abeyance. While the work of Deetjen suggests a more simple solution of the significance of these bodies, certain forms of organisms belonging in the class of Plasmodiophora Brassicæ so closely resemble them that it is not impossible that they represent the amœboid form of some parasite. The lack of well-defined characteristics in the swarming stage of the Myxomycetes greatly increases the difficulty of the problem, but the recognition of the fact that such forms do exist cannot fail to advance our knowledge and may possibly lead to an explanation of some of the obscure problems in infections of undetermined etiology.

Since our last publication we have found but one case of peritoneal fluid in cancer in which we detected the actively moving amœboid

PLATE I.

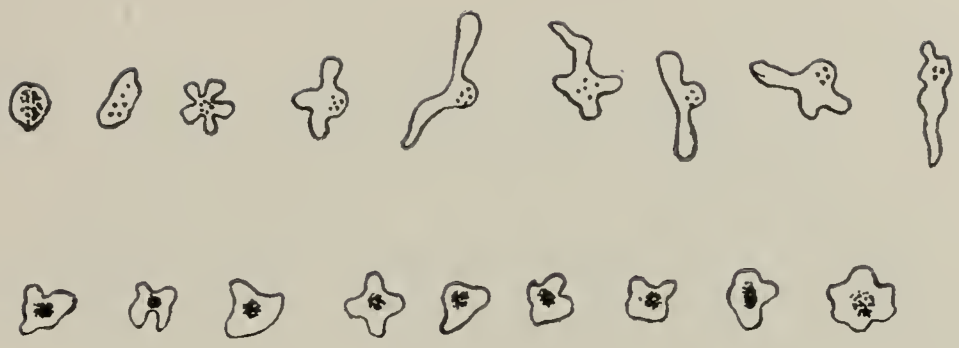

Fig. 1, after Reed.

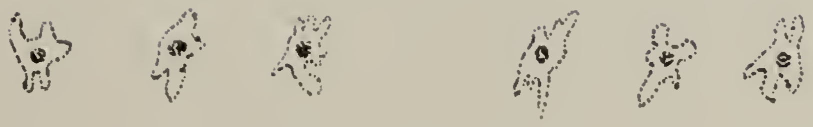

Fig. 2, after Deetjen.

[illegible]
[illegible]
[illegible]

PLATE II.

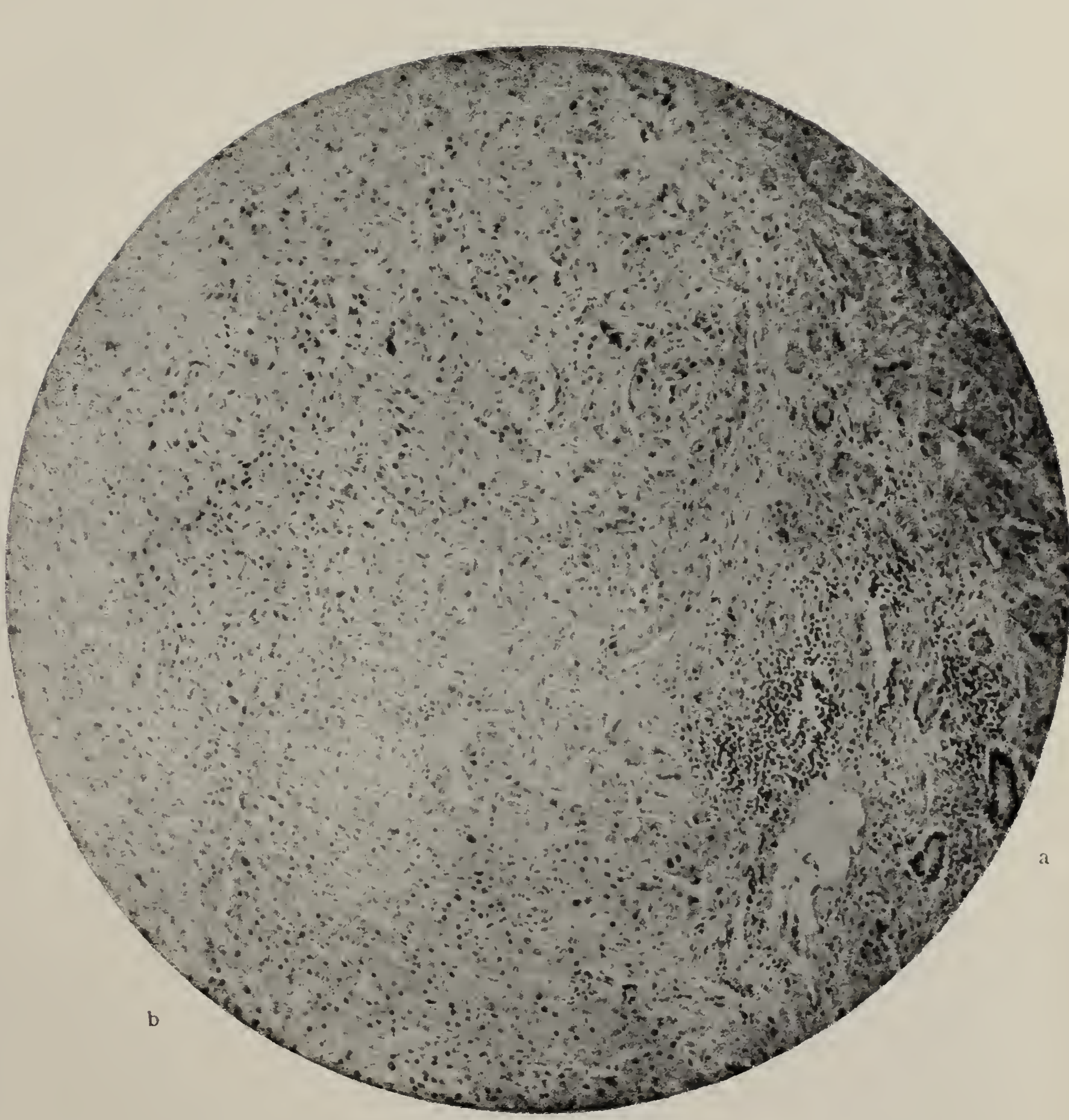

Fig. 3. Inoculation carcinoma of dog's liver; *a.* periportal area; *b.* normal liver; *c.* nodule.

Plate III.

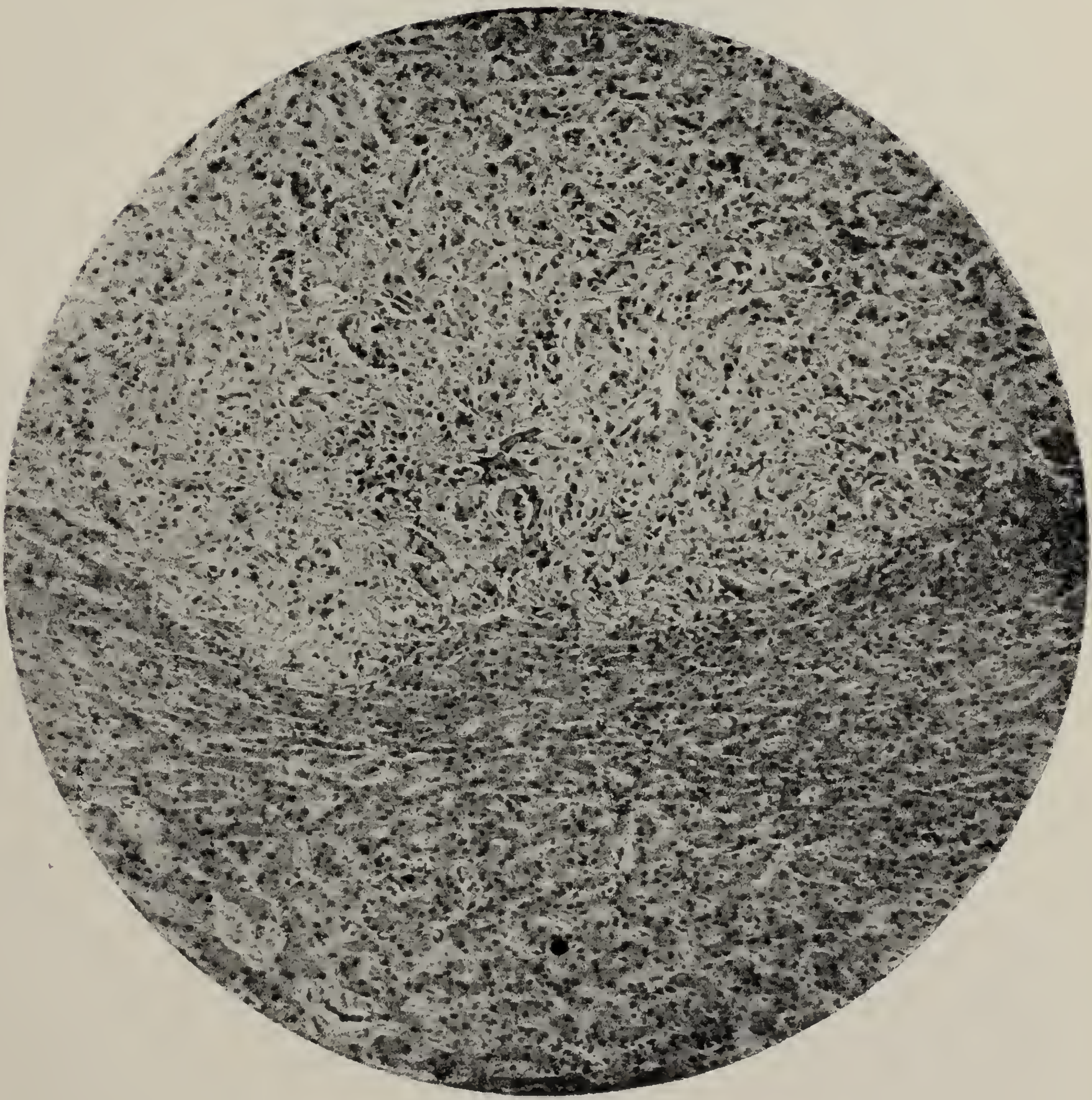

Fig. 4. Margin of inoculation carcinoma in dog's liver. Low power.

PLATE IV.

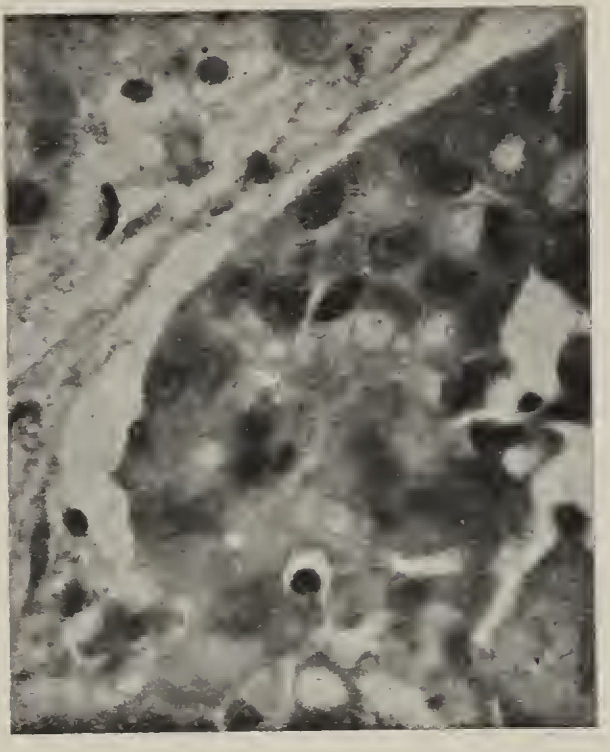

Fig. 5.

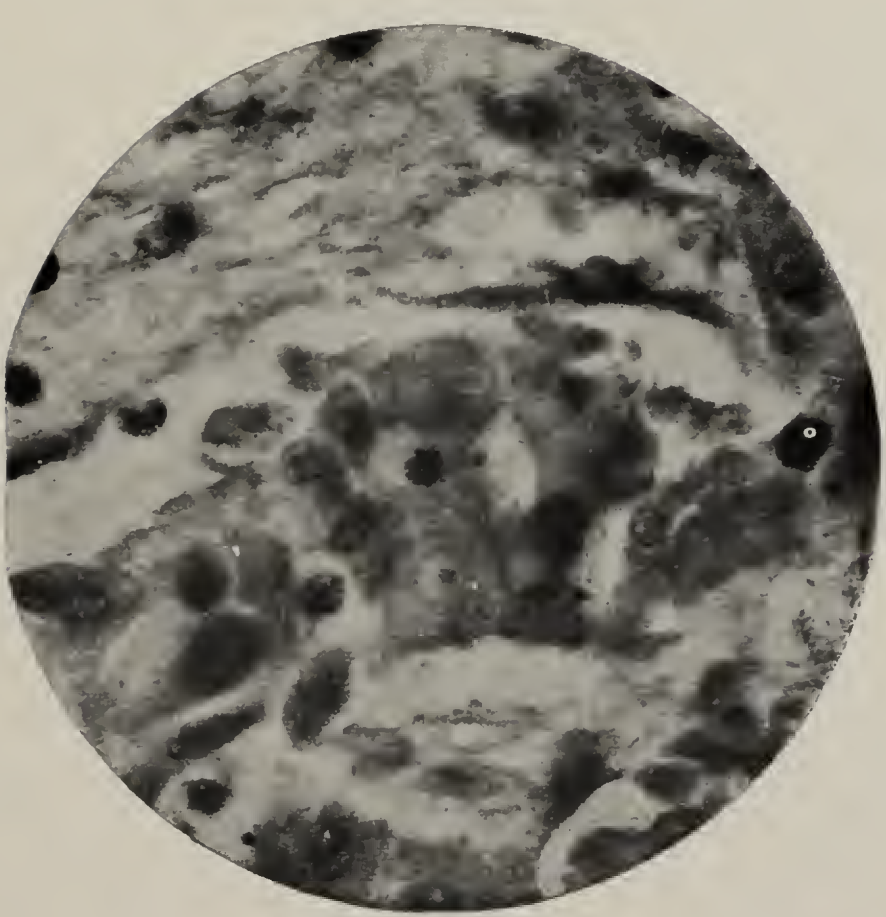

Fig. 6.

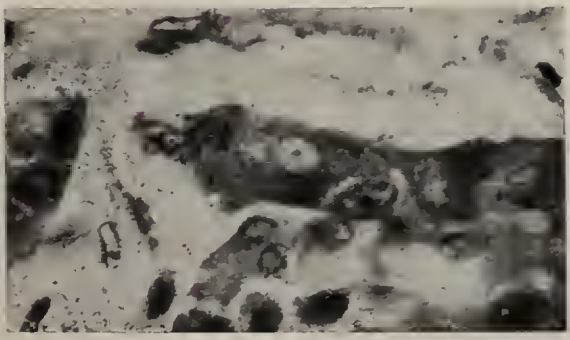

Fig. 7.

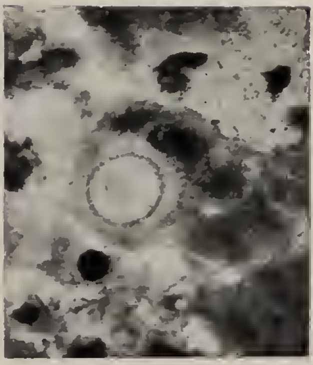

Fig. 8.

forms already described. A number of animals were injected with this fluid, and in one of them, a dog (No. 18), which we arbitrarily killed some ninety days after injection, we found that the liver was filled with firm, whitish nodules which, on section, proved to be new formations derived from the hepatic epithelium. The tissue was hardened in sublimate and on sectioning and staining, according to Plimmer's method, a lesion of almost unique characteristics was found. The nodules varied in size from that of a grain of rice to that of a small pea. They were essentially all of the same character and a description of one will suffice for all.

Under low power the nodules may be readily distinguished by the fact that the epithelium of the nodule is not as deeply stained as that of the surrounding hepatic parenchyma. At the margins of the nodules areas will be found in which the hepatic parenchyma is flattened, but at the greater portion of the periphery the cells are seen to lose their typical arrangement, grow irregularly into the structure of the nodules, staining more brilliantly with the neutral red and present a great variety of form. (Fig. 3.) This merging of the typical arrangement of the hepatic epithelium into the irregularly formed epithelium of the nodule is quite abrupt. (Fig. 4.) With low power numbers of vesicular inclusions can be seen in the epithelium of the nodule. These are extremely frequent, nearly every cell containing one or more. Toward the center of the nodule these inclusions are apparently larger than those near the periphery. At three different points in the periphery of the nodule, are included perivascular connective tissue areas. In each of these the connective tissue stroma is but slightly affected, with the exception of a moderate amount of round-celled infiltration. The epithelium on all sides shows definite evidence of proliferation, whereas the stroma of the periportal area and the epithelium of the gall ducts is unchanged. At the margin of one of these periportal areas is a narrow strip of hepatic epithelium, which has, for the most part, retained its distinguishing characteristics.

Under high power the cell inclusions can be readily distinguished and present all the characteristics of the so-called bird's eye inclusions. (See Figs. 5, 6, 7, 8.) They vary in size from 3 to 10 micromillimeters. The smaller bodies are distributed about the periphery of the nodule and a careful examination of the adjoining normal hepatic structure shows that *without exception the inclusions stop abruptly at the margins of the nodule. In no case have we found a single inclusion beyond the area of transformed epithelium.* The epithelium forming the nodule presents many bizarre forms, the nuclei stain deeply, the outlines of the cell are irregular, the protoplasm takes the neutral red. Passing toward the center of the nodule it will be found that the majority of the inclusions increase in size, and in some cases the structure shows evident signs of disintegration. In many cases the protoplasm of the cell is distended by a large vacuolar space, and in some of these spaces well-preserved leucocytes can be found. It would appear that at the center of the nodule the inclusions have undergone disintegration. Careful examination of the inclusions shows that the predominating form is that with a well-defined margin and spherical or irregular central body. In some of the inclusions the central portion of the central body takes the nuclear stain. In some of the larger inclusions a central body, with grains of chromatin distributed in a circle midway between the center and periphery, are to be found. These larger inclusions frequently present the appearance of poorly formed cysts embedded in the protoplasm, and in some groups of hyaline bodies are easily distinguishable. This transformation in the inclusions suggests some abortive attempt at development. The penetration of leucocytes into the larger structures is in our experience unique. We would conclude from the appearance of the epithelium of this nodule that we are dealing with an infection of the hepatic epithelium progressing at the periphery. A few karyokinetic figures can be found, and the evidences of compression, at certain portions of the periphery of the nodule, indicate that it is increasing in bulk. *The appearance of the epithelium and the entire structure of the nodule are those found in primary carcinoma of the liver.* The arrangement and distribution of the inclusions indicate that they are intimately associated with the proliferation of the hepatic epithelium.

In the light of this experiment we are naturally inclined to adhere to our belief in the specific nature of the small amœboid bodies which *we have observed in the peritoneal fluid.* We have examined a number of peritoneal exudates in cases of widespread carcinoma of the abdominal organs without finding them. It is therefore evident that they are not always present. We have been unable to determine the conditions under which they appear, and it is not improbable that they are present at certain times during the progress of the disease and absent at others. The lesions which we have thus far observed in animals, as the result of inoculation or injection with peritoneal fluid containing these amœboid bodies, have led in a few instances to epithelial proliferation, in this *last case associated with the presence of large numbers of intracellular inclusions presenting all the characteristics of the typical bird's-eye inclusions in cancer.* At the same time these proliferations have presented the characteristics of primary infections of the epithelium and in no case have been associated with metastasis. We are, therefore, inclined to the belief that they are abortive and represent an unusual state of affairs produced by the unnatural introduction of the organism under such conditions that it is incapable of producing more than a temporary proliferation of the epithelium. While this line of investigation has proven extremely suggestive, it does not seem to us that in this way the problem can be brought to ultimate solution. *It is extremely probable that the introduction of an ectogenous cycle, probably in the body of some intermediate host, is necessary before the organism is capable of a primary infection.*

For the purpose of increasing our knowledge of parasites, which might be viewed as being more or less distinctly related to the forms we have observed in cancer, which we believe to be parasitic, we have undertaken an investigation of certain protozoan parasites, and because of striking characteristics which the organism presents we have undertaken a study of the intracellular parasite of clubroot, known as Plasmodiophora Brassicæ. A description of this organism, so far as our investigations have led us, is hereby submitted.

PLASMODIOPHORA BRASSICAE (WORONIN).

By Harvey R. Gaylord, M. D.

This organism, discovered by Woronin in 1876, is the recognized cause of a disease of many of the edible Cruciferæ, notably all kinds of cabbage, cauliflower, turnip, radish, kohlrabi, and, according to Tubeuf, has also been found in *Iberis umbellata, Capsella bursa-pastoris, Mathiola incana.* The infection of the vegetables above named by this organism is followed by the development upon the roots of tumor-like outgrowths and swellings of varying size and bizarre form. (Fig. 1.) The foliage of the infected plant is usually stunted, and as the disease progresses shows such evident wilting that the infected plants can be readily detected by this means alone. The disease has a very extensive distribution and is of considerable economical importance. It is known in this country as "clubroot," "clumproot" and "clubbing." In England it is usually spoken of as "finger-and-toe disease" or "anbury"; in Russia, where the organism was discovered, "kapoustnaja kila"; in Germany as "kohlhernie," "kohlkropf" or "vingerzichte," and in Belgium and France as "maladie digitoire." The distribution of the parasite seems to be as extensive as that of the plants which it infects. The disease produced such ravages in Russia that in 1872 the Royal Association of Gardeners offered a prize for the discovery of the cause and a means of prevention. The disease was first noted in Scotland in 1789. According to Eycleshymer, writing in 1891, the stronghold of the disease in the United States is in New England and the Middle States, especially in Connecticut, Rhode Island, Massachusetts, New Jersey and Delaware and the southeastern portions of New York and Pennsylvania. It had at that time, however, extended to Maryland and Virginia and the Carolinas. It had also been noted in Missouri, Wisconsin, Iowa and Michigan. This author has also called attention to the fact that the disease occasionally develops in newly broken ground where no crop has yet been grown, and believes that this indicates that certain soils harbor the organism as a saprophyte. The disease is most prevalent in unusually wet seasons, and is almost endemic on land which is poorly drained and damp. It seldom occurs where the loam is sandy or calcareous. The same author calls attention to the fact that in the neighborhood of limestone outcroppings the vegetables are comparatively free from attack, and states that on Long Island the gardeners raise their cabbages year after year on the old shell heaps without any trace of the disease. The disease is known to occur in fields which have been covered with compost, where the adjoining fields which had not been fertilized were free from attack.

The organism which produces these outgrowths and tumor formations presents many points of interest. Woronin, who gave it the name of Plasmodiophora Brassicæ, classified it among the Myxomycetes, an order of uncertain position, but generally viewed as lying midway between the animal and plant kingdoms.

DeBary,[1] who considers this order to belong more properly to the animal than to the plant kingdom, has suggested the name *Mycetozoa,* which, according to more recent classifications, is preferable. Certain groups of these organisms present characteristics which identify them with the lowest forms of plants, while others present characteristics which unmistakably indicate that they are of protozoan nature. To this last group undoubtedly belongs *Plasmodiophora Brassicœ.* Doflein[2] so classifies the organism, and in fact places the order *Mycetozoa* under the *Rhizopoda.* The lower forms of this order present many points of similarity to the *Amœbœ* and the *Heliozoa,* but differ distinctly from these organisms in their developmental cycle. In fact, very little is known about the entire class, and without doubt many points in the cycle still remain to be determined. Duflein divides the order into two suborders, Protomyxidea and Mycetozoidea.

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[1] Comparative Morphology and Biology of the Fungi, Mycetozoa and Bacteria. 1887.

[2] Die Protozoen als Parasiten und Krankheitserreger nach biologischen Gesicthspunkten dargastellt. Jena. 1901.

The organism we are considering is placed by this author in the first suborder. The developmental cycle of these organisms differs according to their position in the scale. The higher, those which most closely approximate the fungi, present more or less complicated cycles, but in none has a sexual phase been determined. So little is known about them, however, that it is highly probable that we are but imperfectly acquainted with the life cycle of even the lowest forms. The simplest form of the Mycetozoa is found in a minute mass of protoplasm, the so-called swarm spore, which develops into Myxamœbæ. In this phase the Myxamœbæ may change their form, protrude delicate flagella and are then known as myxoflagellates. The flagellate and amœboid forms are practically interchangeable. As an amœba the organism contains a more or less well-defined nucleus and occasionally a contractile vacuole. It may divide and in this way increase in number; it may become encysted as a single amœba, or certain of the organisms may increase in size until cysts of considerable dimensions are formed in which there develop a number of spores. In all probability this stage is preceded by some form of copulation as yet undetermined. The spores in this case, after liberation from the cyst, probably develop within them swarmers, which, on escaping, take on the form of myxamœbæ or flagellates. Fig. 2, adapted from Doflein, illustrates what is known of the cycle of the *Protomyxidea,* the suborder to which *Plasmodiophora* belongs. Question marks inserted in this cycle indicate that possible intermediary stages are as yet undetermined.

The organism *Plasmodiophora* as described by Woronin was first noted in the spore form as minute, spherical, yellowish-green bodies of uniform size, filling the enlarged cells of the infected plant. (Fig. 3.) These cells were usually arranged in groups. Besides the spores, Woronin recognized the presence in certain cells of large masses of protoplasm more or less filling out the sap spaces of the cell. These he viewed as the plasmodial form of the organism.

As to the ectogenous phase of the parasite, Woronin noted that the spores presented a definite delimiting capsule within which granular protoplasm could be detected. The mass of protoplasm within the cyst later developed into a definite body or swarmer which, on the

PLATE V.

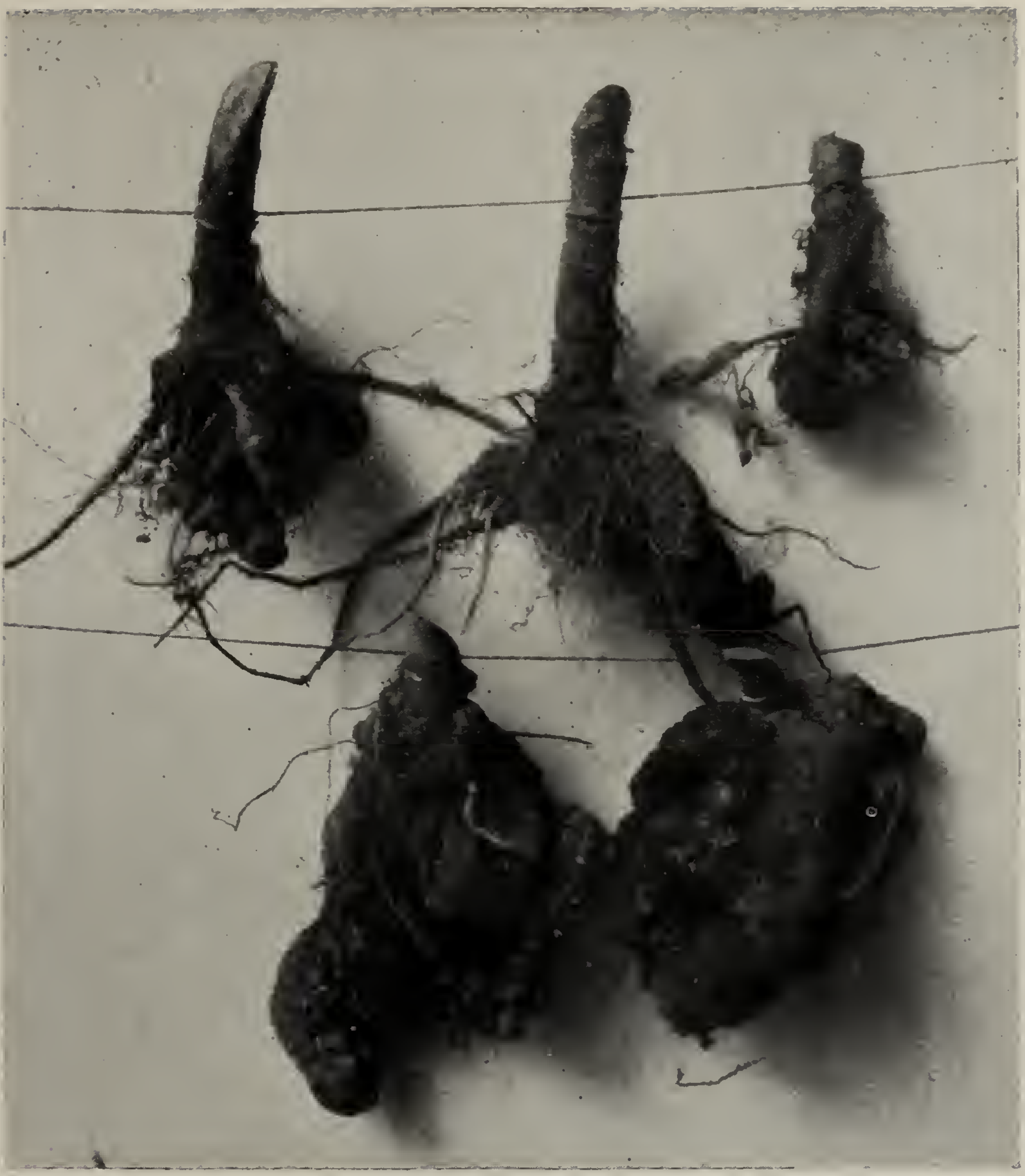


Fig. 1.

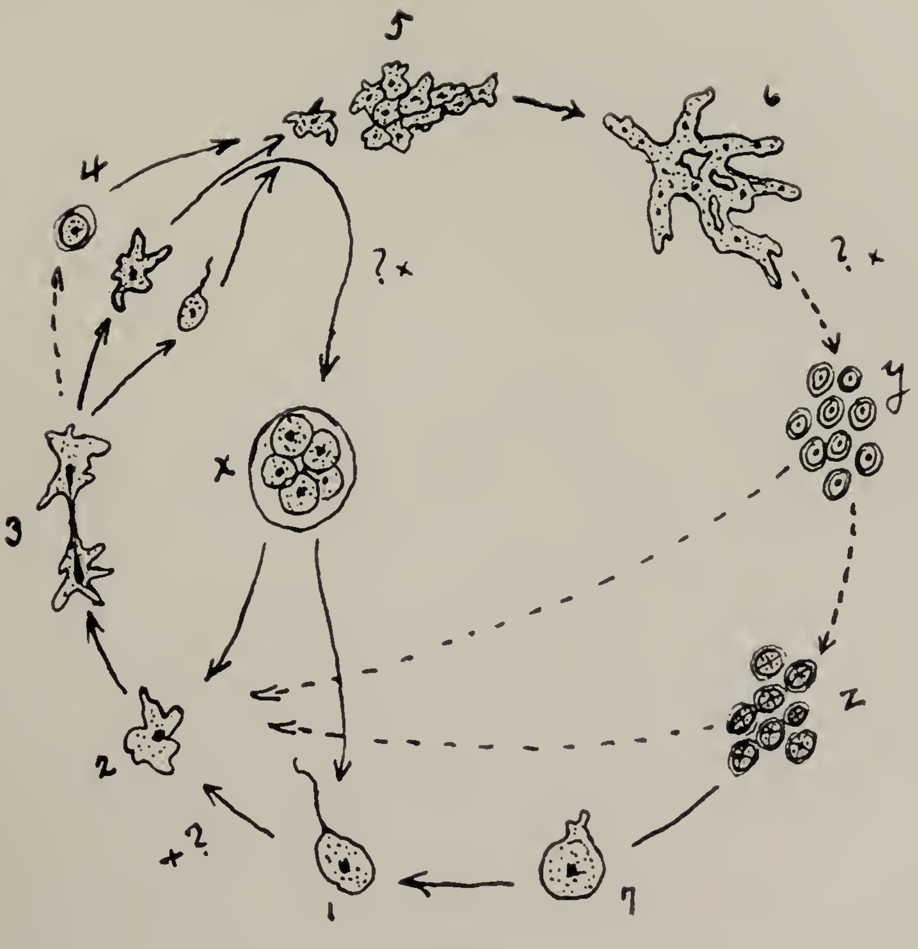
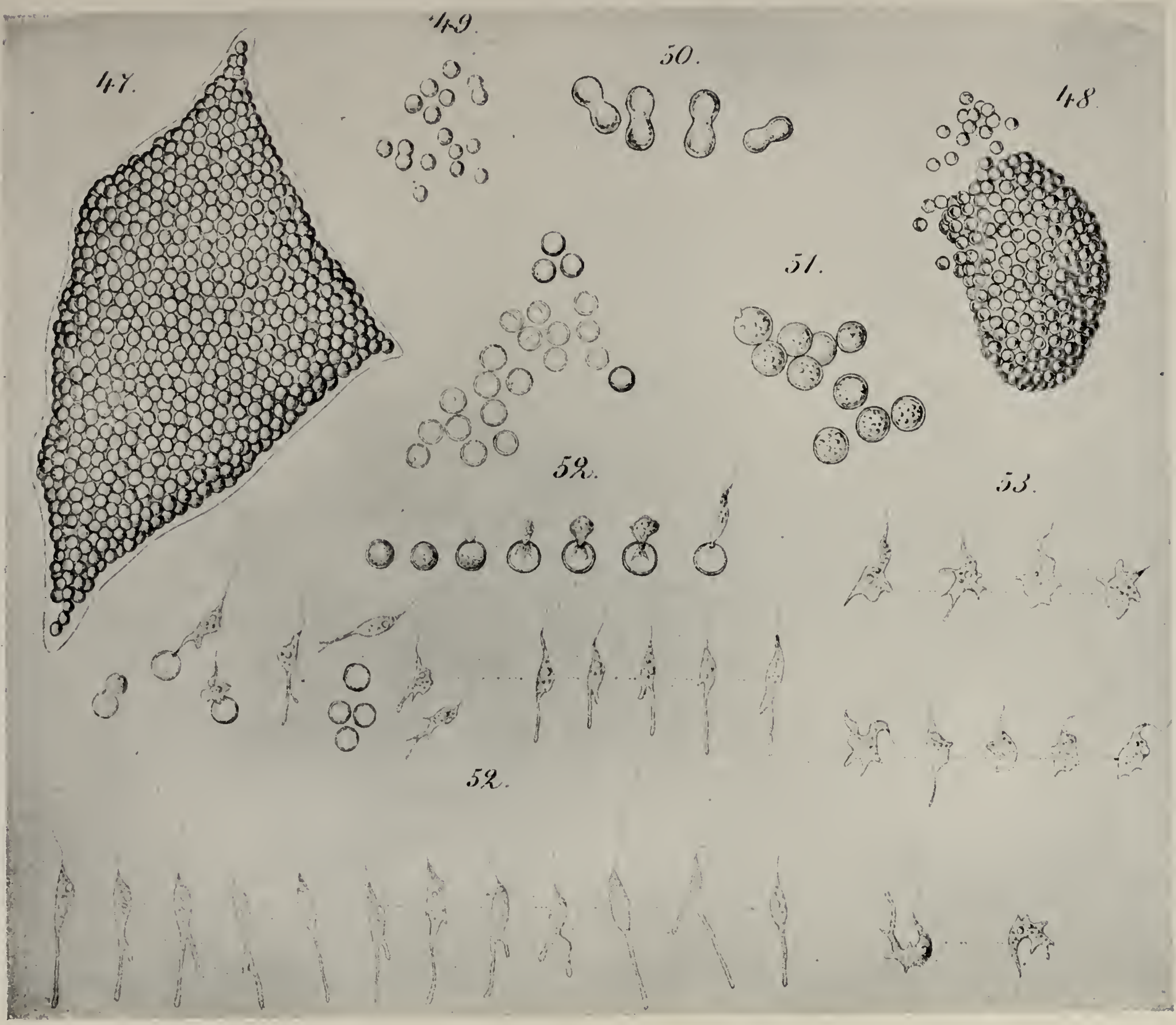


Fig. 2.

PLATE VI.

Fig. 3.



Figs. 47, 48, 49, 50, resting spores; 51, beginning germination; 52, escape of the myxamœbæ from the cysts; 53, free amœbæ.

bursting of the cyst, was liberated and thereupon took on the form of an amœba, showing more or less active amœboid motion, or protruding delicate flagella and moving about the field in the form of a flagellate. Fig. 3, after Woronin, sufficiently illustrates this phase of the organism. Woronin determined that the organism observed was the cause of the tumor-like outgrowths in which they were found, by infecting ground with the dried roots of infected plants. By so doing he established beyond question the relation of the organisms to the disease.

Upon the disintegration of the roots the spores of the organism remain in the ground until the following season, when with the advent of warm weather the swarm spores are liberated from the spore cysts and infect the growing plants. The exact method by which the amœboid or flagellate form of the organism enters the uninfected plant has never been definitely determined, but it is generally supposed to be by means of the root hairs.

Infection may occur, according to Woronin, at any period during the life of the plant and affects not only early but late vegetables.

The article of Woronin remained for many years the only extensive investigation of this organism. Many notes as to its occurrence, methods of prevention, etc., are to be found in the agricultural literature, but no advance was made in the subject until the publication of Nawaschin.[1] This author undertook an investigation with modern histological methods to clear up the obscure phases of the organism in the plant cells, to investigate the changes produced in the plant by the organism, and the nature of the relations between the cell and the parasite. It may be remarked that the closing paragraph of Woronin's article called attention to a possible relation between these tumors in plants and those found in man and animals. The wording of this paragraph is so significant in the light of present investigation and it is so seldom referred to, although made in 1878, that it would seem desirable to give it verbatim:

> Ich vermuthe nämlich, dass die Erscheinung und Entwickelung vieler pathologischer Auswüchse und Anschwellungen, die auf dem thierischen Organismus vorkommen, auf folgende Weise erklärt werden können: In

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[1] Flora. Bd. 86, H. 5, 1899.

den lebendigen Organismus dringen, auf irgend welchem Wege, kleine Myxamöben ein, die sich allmählich in Plasmodien entwickeln und im Gewebe dieses oder jenes Organs eine bedeutende Reizung hervorrufen; dieses verursacht im Organ eine pathologische Veränderung des ganzen Gewebes, von welcher denn auch die Form und Grösse der krankhaften Auswüchse oder Anschwellungen abhängig sind. Nächstfolgende Untersuchungen werden zeigen, ob meine Vermuthung sich bestätigen lässt.

In the introduction to this article Nawaschin calls attention to the closing paragraph of Woronin's article above given and notes the fact that from the standpoint of general pathology Plasmodiophora is worthy of special attention as an intracellular parasite, producing a specific tumor which bears many analogies to the so-called "malignant" tumors in animals and man. He furthermore calls attention to the fact that Plasmodiophora undoubtedly stands very close to the Sporozoa, the recognized cause of many infections in animals. Nawaschin's work deals exclusively with the results of sectioning and the staining of the plant tumors and has thrown much light on the intracellular phases of the organism. This, he finds, makes its first appearance within the plant cell in the form of a well-developed amœba, which in osmic acid preparations (Flemming or Hermann) may be immediately detected within the plant cell as a mass of closely packed, regular, blackened, granules. On careful examination with higher powers these granules are found to be embedded in a mass of protoplasm with more or less well-defined outlines. (Fig. 4.) Between the granules one or more clear spaces will be found within which a spherical, centrally placed body, bright red in safranin preparations, can be distinguished. These prove, on further observation to represent nuclei. If the osmic acid is removed from the preparations these nuclei are found to be surrounded by the protoplasm of the amœbæ. The youngest amœbæ observed by Nawaschin have always possessed at least two nuclei. These present definite characteristics. They are spherical or oval in the resting stage, have a fairly well-developed nuclear membrane, are apparently filled with a clear fluid and possess a highly refractile central body, as he expresses it, "of nucleolar nature." The infected plant cells are always arranged in groups, and each cell usually contains more than one amœba.

PLATE VII.

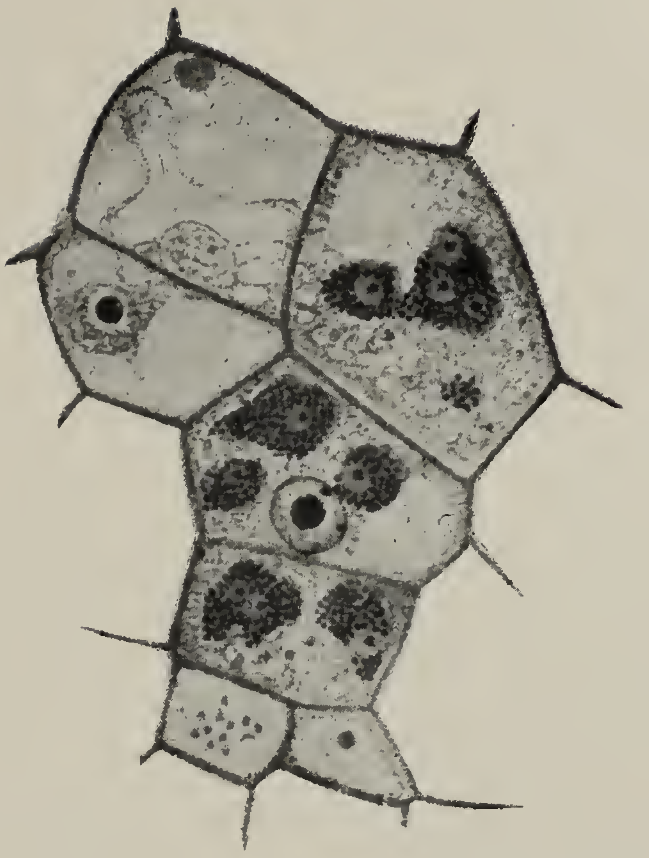

Fig. 4.

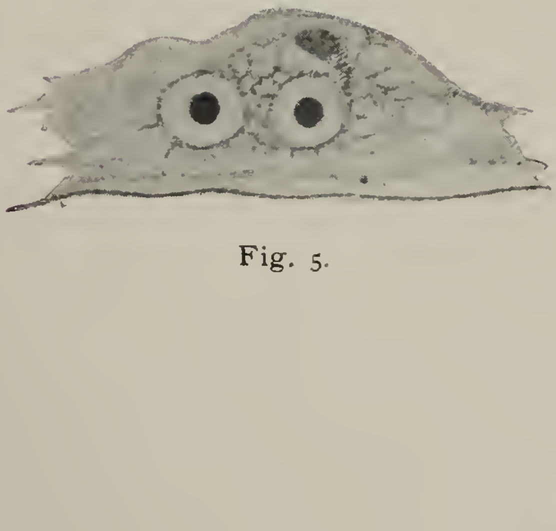

Fig. 5.

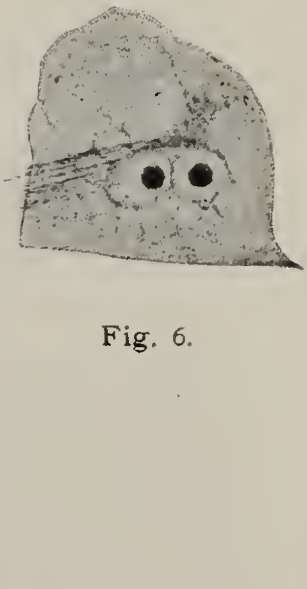

Fig. 6.

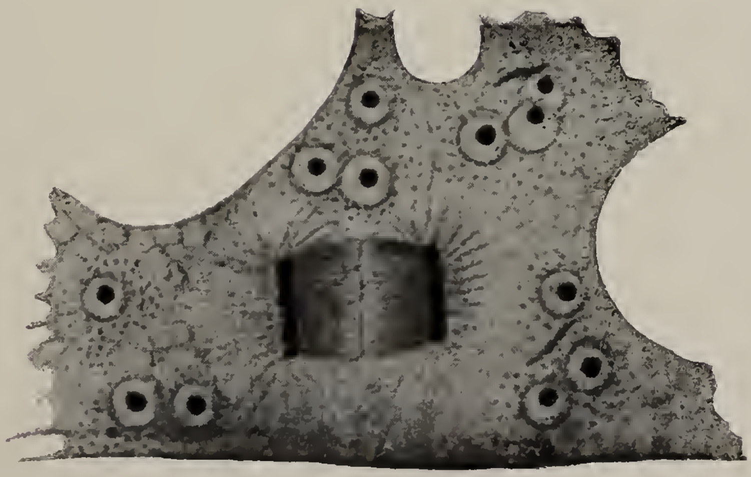

Fig. 7.

The normal plant cell possesses a well-defined membrane of cellulose lined by a narrow layer of protoplasm which extends in bridges to the nucleus, which lies in varying positions within the cell cavity. The spaces between the bridges of protoplasm are filled with cell sap. It is within the sap spaces that the amœbæ first make their appearance. The method of their entry as swarm spores into the infected plant is, as we have stated, as yet undetermined. The nucleus of the plant cell is spherical, oval or of irregular shape, possesses a nuclear membrane and a large, spherical or irregularly shaped nucleolus. It is many times larger than the diameter of the largest nuclei in the amœbæ and can readily be distinguished by its characteristic appearance. The conditions within the plant cell are so simple that the morphology of the parasite and its relation to the cell can be determined with great accuracy. Fig. 4, after Nawaschin, represents a preparation from which the osmic acid has not been removed and the amœbæ are seen within the plant cell sharply defined by the regular, black granules embedded in their protoplasm. The differentiation of the protoplasm of the amœbæ in preparations from which the osmic acid has been removed is not invariably well-defined. This is especially true of the very young organisms. In these the protoplasm of the organism may be poorly developed, and in fact consist of mere threads extending into the surrounding plant protoplasm, in which it is apparently lost. Figs. 5 and 6, from Nawaschin, represent two young amœbæ immediately after division of the nuclei. The protoplasm in these cases presents the characteristics just mentioned.

While Woronin believed that the increase in number of amœbæ within certain cells was probably owing to the fact that the organism at this stage passed from one cell to the other, Nawaschin has shown that this interpretation is incorrect. He has never been able to detect any amœba in the act of passing through the wall pits of the cells. He has been able to determine that they increase in number by division, that the presence of the organisms for a long period causes no change in the plant cell; that during this stage *the organism lives in a state of symbiotic relation with the host cell, until through proliferation the number of amœbæ in the plant cell makes sufficient* *demands upon the nutrition of the cell, whereupon the host cell divides by the regular process of karyokinesis.* The amœbæ in this case are more or less equally distributed in the daughter cells. (See Fig. 7, from Nawaschin.) By this means, according to Nawaschin, the organism is distributed in the diseased portions of the plant. The fact that the infected cells lie in groups is thus explained. When, however, the demand upon the infected cell can no longer be met and the nutrition is finally exhausted, the amœbæ pass through certain preparative changes, finally coalesce to plasmodia, the nuclei all divide by the regular process of karyokinesis and the entire mass is divided up into minute myxamœbæ, each with a single nucleus. These myxamœbæ secrete a membrane about them, take on a spherical form and become condensed into spherical spores. There is no sac (peridium) formed about the plasmodium in this process of spore formation, but as Woronin has pointed out, in all probability the absence of the peridium is due to the fact that there is no necessity for this formation, the walls of the exhausted plant cell performing this function.

The first evidence of nuclear division is found in the appearance within the clear space between the periphery and central body of minute grains of chromatin irregularly placed. These arrange themselves in a plane, which later becomes that of division, in a circle about the central body. This first becomes elongated and then divides. A longitudinal section at this stage shows two closely approximated central bodies with two small grains of chromatin in the plane of division, but close to the divided central body. In cross section this figure usually presents the appearance of a rosette, the central body being surrounded by more or less equi-distant granules of chromatin. The central bodies then withdraw to the poles of the cell and half of the chromatin becomes intimately associated with each. The elongated nucleus is then divided into two spherical smaller nuclei by the capsule passing into the center and coalescing. In this phase it commonly occurs that the entire elongated nucleus is bent upon itself, which results in the nuclei, when completed, being placed at a slight angle to each other and presenting a characteristic appearance, as shown in Fig. 6, from Nawaschin. Nawaschin has not attempted to analyze this method of nuclear division, but it will be seen that it is entirely distinct from the process of coalescence and regular karyokinetic changes in the resulting plasmodium which terminates in spore formation.

It will be seen by observing the illustrations taken from Nawaschin that the nucleus of the amœboid form of Plasmodiophora presents a very distinct similarity of appearance with the cell inclusions noted in cancer, a fact which has been noted by von Leyden and others.

The analogy between the tumors resulting from the infection of the plant by this organism and malignant tumors in man and animals, as pointed out by Woronin, was emphasized by the observations of Behla,[1] who noted the great frequence of clubroot in the gardens of the inhabitants of a certain portion of the town of Luckau, in which cancer was particularly prevalent. He likewise found that fragments of the plant tumors inoculated into animals produced swellings and tumor-like formations, but he was unable to detect the parasite in the animal tissues. A more direct support of the analogy is to be found in the preliminary statement of Podwyssotzki, 1900, who found that animals inoculated with fragments of clubroot developed tumors which possessed certain points of similarity to the sarcomata and endotheliomata. The attention of Podwyssotzki was attracted to Plasmodiophora Brassicæ through the work of Nawaschin, both of these observers being members of the faculty of the University of Kieff. Podwyssotzki's conclusions are of such great interest that it is desirable to quote them in full:

1. It is possible to produce by inoculation with Plasmodiophora Brassicæ tumors in animals, thus far rabbits and guinea-pigs.
2. These tumors are of mesodermic origin and in the progressive stage are similar to large celled sarcomata or endotheliomata, or the granulomata found in leprosy.
3. These tumors are the result of a marked hypertrophy and proliferation of the fixed connective tissue elements, especially the endothelium of the perivascular lymph spaces. One is, therefore, justified in speaking of a mycetozoan perithelioma or granuloma. The proliferation leads to the formation in the neighborhood of the blood vessels of larger or smaller infiltrations or nodular formations. Leucocytic infiltration is demonstrable

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[1] Behla. Die geographisch-statistische Methode als Hülfsfactor der Krebsforschung. *Zeit. f. Hygiene u. Infectionskrankheiten,* Vol. 32, p. 123.

in the first stages of the infection, but disappears from the eighth to the twelfth day.

4. The spores of Plasmodiophora Brassicæ are found in the tumor cells either singly or in great numbers. In the latter case the cells are greatly distended and the spores are surrounded by a mucin-like substance which gives the whole the appearance of a plasmodial mass filling the body of the cell.

5. The more mature tumor cells contain the greater number of spores. Many of these are so greatly distended and show such marked vacuolization that they are apparently being destroyed. For this reason the central portion of the tumor is often represented by a yellowish, half dry mass of disintegrated cells.

6. The most peripheral or youngest elements of the tumor contain fewer of the spores. These are difficult to demonstrate. It can only be accomplished by a careful comparison of the different stages of metamorphosis from the centrally arranged older cells of the tumor containing large numbers of well-defined spores.

7. In many places in these tumors may be found giant cells, including within their bodies numbers of spores. In some of these giant cells the spores have disappeared.

8. The nuclei of the infected cells for a considerable period show no changes aside from increase in size and chromatin content. Many of the cells containing spores show evident mitosis, proving that the parasite induces proliferation of the nuclei.

9. The picture presented in these nodular formations can be most easily understood as evidence of specific phagocytosis, as undoubtedly many of the spores are destroyed within the cells, in which case they gradually become incorporated with the protoplasm of the cell and can no longer be differentiated. It was undoubtedly the cells of this sort which were observed by Behla and which led him to the conclusion that portions of clubroot after transplantation into animals produced infection, although the parasites could not be detected within the cells.

10. It would seem that the nuclear substance of the spore undergoes a progressive metamorphosis. In many of the spores two or more chromatin containing nucleoli may be found. The spore in this case presents an appearance suggestive to the differentiation found in mitosis. It is, however, impossible to affirm with certainty that an actual increase of elements within the spore occurs. This question must be the subject of future investigation. In many cells, however, the parasite may be found without the characteristic capsule. Under any circumstances it would be difficult to explain the infection of cells so far from the center of the tumor without an increase of elements within the spore, as it is impossible that the comparatively large spores (about the size of an erythrocyte) should be carried by the lymph through the small lymph spaces. Spores within the leucocytes have never been encountered.

11. The larger cells in sections fixed in Flemming's fluid present an extremely interesting picture. Surrounding the single spores the adjacent protoplasm of the tumor cell is filled with closely arranged minute fat droplets, so that the infected cell is readily detected even with low power. Such cells present the appearance of a vacuolated cell, each vacuole surrounded by fat droplets. Under oil immersion the structure of the cell can be

readily determined, and it would appear that the minute fat droplets are a portion of the parasite, the protoplasm of which, in the vegetable tumors, is normally filled with fat droplets. The fat remains within the spores after implantation in the tissues of animals, so long as the spore remains free. It diminishes in the spores so soon as they are taken up by the connective tissue cells. When this has occurred the spores gradually lose their fat, with the exception of one or two minute fat droplets within the capsule.

12. In an extremely malignant case of sarcomatosis of the peritoneum, kidneys, thyroid and other organs of a child, from the clinic of Professor Tchernoff, I have observed the presence of cells presenting the characteristics of those above described. They were especially prominent in preparations hardened in Flemming's fluid, where they could readily be detected with low power because of the blackening resulting from the presence of the fat. Under oil immersion these cells were found to contain a number of minute round bodies within vacuoles. A further report of these parasitic inclusions will appear later.

Since the appearance of the preliminary statement of Podwyssotzki no one has apparently disproved or confirmed his results. One or two observers have confirmed the similarity of appearance between certain forms of Plasmodiophora and the inclusions in cancer (von Leyden, Feinberg) while others (Lubarsch, Nösske) believe that this analogy is not justified.

Results of inoculation experiments with Plasmodiophora.—Early in 1901, through the kindness of Professor Welch, we came into possession of the article of Nawaschin, which naturally fixed our attention upon the preliminary statement of Podwyssotzki, above mentioned. Since that time we have been experimenting with Plasmodiophora in various ways. Through the kindness of Dr. Erwin F. Smith, of the Laboratory of Plant Pathology, Washington, D. C., we were placed in communication with Prof. L. R. Jones and Mr. W. J. Morse of the Agricultural Experiment Station at Burlington, Vermont. These gentlemen have repeatedly furnished us with young clubroots, grown for us in their greenhouses during the winter. Through Dr. Smith we were likewise placed in communication with Dr. M. C. Potter of the Durham College of Science, Newcastle-upon-Tyne, from whom we were able to obtain a quantity of clubroots from England. Careful comparison of the Plasmodiophora obtained from this source and that found in America shows no distinguishable difference. To all of the gentlemen mentioned we are deeply indebted and desire to express our thanks for much assistance.

With the material obtained from these sources and with clubroot obtained from the neighborhood of Brookfield, N. Y., where the disease is prevalent, to which our attention was called by Dr. I. P. Lyon, and the neighboring town of Hamilton, where it is apparently still more prevalent, we have had no difficulty in infecting earth. Cabbages and other varieties of Brassicæ grown upon this ground, either in the greenhouse or in the open, in a prepared bed at the rear of our Laboratory, have supplied us continually with material. Fig. 8 is a photograph of a specimen raised in the bed above mentioned during the past summer. We began our investigations by careful examinations of the fresh material. The spores of the organism could be readily detected in freehand sections, or in scrapings from the fresh surface of the clubroot. Many of the infected cells were found filled with these closely packed spherical bodies. (See Fig. 3-43, from Woronin.) They measured 3.33 μ in diameter. Some of them were homogeneous (see Fig. 3-49, from Woronin). In some a delicate outline within the delimiting capsule could be observed, and in the majority one or more highly refractive bodies. *The relation of these spores to osmic acid was ascertained with the result that the various forms were found to blacken after treatment of a few hours. This blackening affected the capsule of the spore and the highly refractive central body. Where the spores were homogeneous they took on diffuse blackening.* The color was usually yellowish-green, rarely of a brownish tinge. *When treated with Sudan III, some of the spores stained intensely while others took up the stain less rapidly. In the spore forms containing a well-defined, highly refractive central body, this and the capsule were usually first blackened by osmic acid or stained by Sudan III, as the case might be.*

In young clubroots the amœbæ described by Nawaschin could be readily detected. These were found in the form of spherical or oval masses of protoplasm within the sap spaces of the plant cell, filled with coarse granules, approximately one micromillimeter in diameter. These granules were highly refractive and in many cases

PLATE VIII.

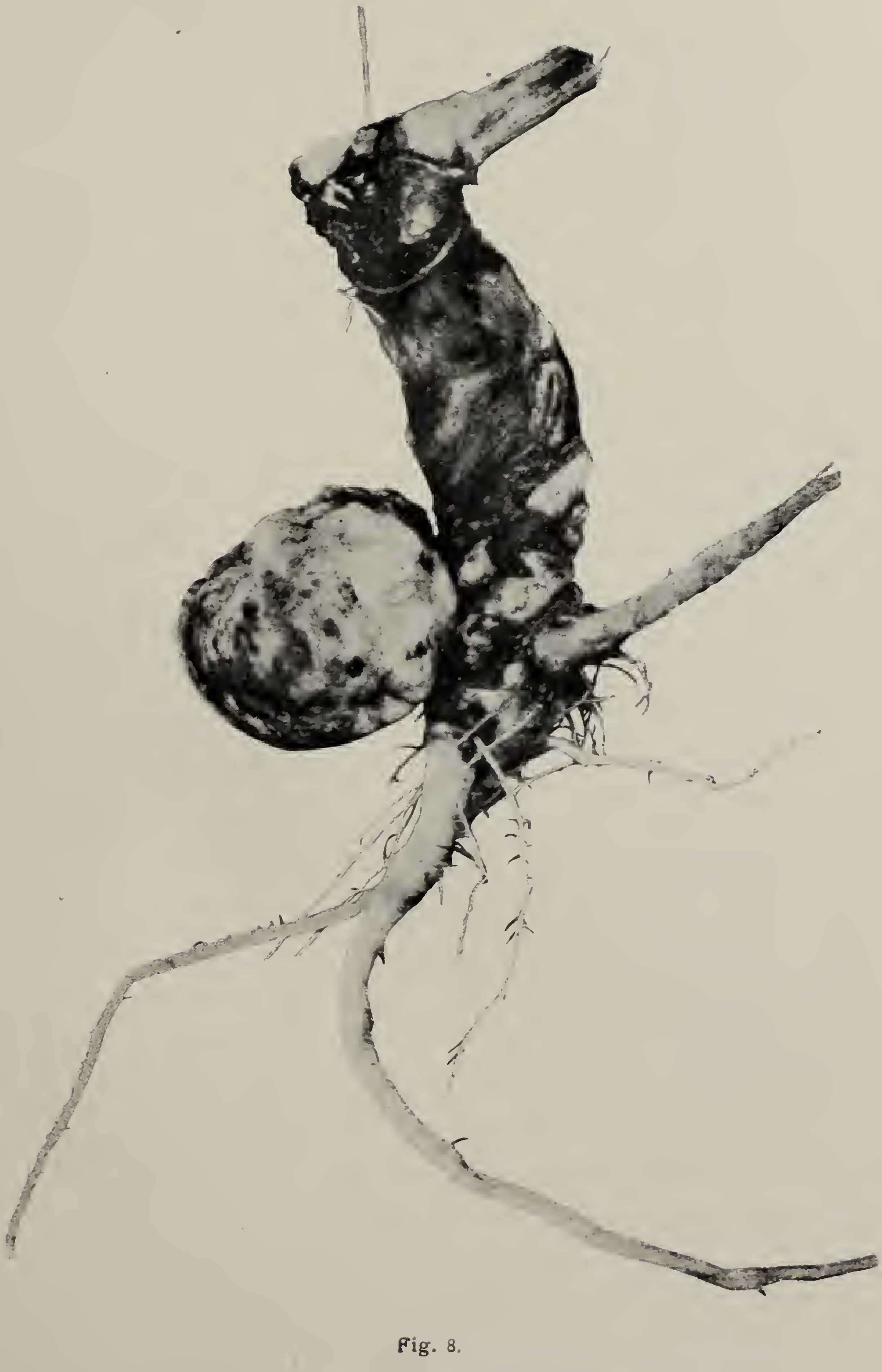

Fig. 8.

Club-root in the cabbage. Grown in artificially infected soil.

were in active motion. The nuclei of the amœbæ were visible as vacuoles in the protoplasm, and occasionally a highly refractive central body could be observed. The whole appearance of these forms, *with the exception of the nucleus,* could only be compared to that of an eosinophile, as they appear in fresh preparations. The striking character of this resemblance was extremely impressive. Occasionally free amœbæ could be detected in the fluid of the scrapings, in which case they were spherical, the granules usually in active motion. Attempts were made to fix and stain them but without great success, the best results being obtained in the sections to be described later.

This phase of the organism will continue to offer a field for research for some time. The observations thus far reported are largely confirmatory, with the exception of certain forms thus far undescribed. An article on the staining affinities of various forms of the organism will be published shortly by Dr. Matzinger, with whom the observations on the ectogenous cycle of Plasmodiophora Brassicæ were jointly conducted.

For the purpose of observing the development of the organism portions of dried clubroot were placed in flasks containing sterile water and allowed to remain at room temperature. In many cases the water in the flasks was rapidly overgrown by bacteria, but in a few cases where the bacteria did not develop with such rapidity we were able to trace the development of the swarmers within the spore cysts, their liberation from the spore cysts and their presence free in the fluid. The smallest recognizable form of the organism (swarmers) is a spherical, highly refractive body resembling a minute drop of fat, varying in size between 1 and 3 μ, *each having attached to it a delicate, thread-like flagellum, so fine as to be scarcely distinguishable even with the highest powers. This minute, spherical form of the organism moves about rapidly in the field by the movement of this delicate thread. In preparations treated with osmic acid the body of this form of the organism fails to blacken even after prolonged treatment.* The next recognizable forms of the organism are the myxamœbæ and myxoflagellates, the latter being more common. The swarmers can be seen developing within the spore cyst, as described by Woronin (see Figs. 3-51-52.) Our experience in this connection is of interest, inasmuch as no less an authority than

Tubeuf[1] has recently stated that he has never been able to observe this phase and that the late Professor Frank had likewise never succeeded in causing the spores to develop into cysts with the liberation of the swarmers. von Leyden has also made the same statement.

The development of the swarmers within the spores begins by the spore increasing in size to about 4 to 6 μ, the highly refractive body within the spore sac gradually disappearing and the contents of the sac taking on a well-defined granular character. This granular protoplasm (also shown by Woronin) gradually contracts until the mass within the spore sac can be easily distinguished from the surrounding membrane. At the proper time the spore sac bursts, liberating the mass of protoplasm, which, after passing into the surrounding medium, takes on the form of a myxamœba or of a myxoflagellate. The protoplasm of the organism at the time of liberation is homogeneous. A nucleus can occasionally be observed, but is extremely indistinct. All attempts to harden and stain the organisms in any of the forms described, have given but unsatisfactory results. In the most successful attempts the organism appears as a mass of protoplasm of rounded or irregular form, with a center staining somewhat more deeply than the surrounding protoplasm. We have never been able to demonstrate the presence of a contractile vacuole. The organism in this stage is so lacking in characteristics that all attempts to establish a means of identification have been unsuccessful.

Inasmuch as it is in this phase that the organism is supposed to infect the plant, we have attempted to detect the swarmers and flagellates in the tissues of animals. Cultures containing large numbers of the swarmers have been injected into animals intravenously and directly into the tissue, the animal being killed and the tissues hardened within a few minutes after the injection. In no case have we definitely succeeded in locating the swarmers by their appearance. *Once in the tissue, becoming rounded, they present an appearance so like structures usually interpreted as degeneration products, that it is impossible at present to recognize the organism with certainty.*

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[1] Verhandlungen der Komité für Krebsforschung. Sitzung am 9 Januar 1902.

Examinations of clubroot by means of hardened and stained sections.—The staining method which we have principally utilized is the method of Plimmer, inasmuch as we desired from the beginning to compare the appearances of the organism to the cell inclusions in cancer, as demonstrated by this method. The method recommended by Nawaschin has likewise been employed, and as given by this author is as follows: Very small portions of the infected root are placed in strong Flemming's solution, where they are allowed to remain twenty to twenty-four hours, when they should be removed, as longer action of the fixative permanently blackens the protoplasm of the organism. After embedding in paraffin, sections two or three micromillimeters are cut and attached to the slide by cohesion. When it is desired to remove the osmic acid from the preparation the sections and slides are placed in hydrogen peroxide, full strength. Preparations are mounted in thickened cedar oil stained with Feinberg's safranin-gentian-violet-orange stain. Sections are first stained with one per cent safranin solution, washed in water and then counterstained with two per cent gentian-violet solution. Pass through alcohol and clear in clove oil which has been saturated with orange, in which they may remain a considerable length of time without overstaining. They may then be cleared with xylol and mounted in balsam, or cleared in commercial oil of cedar and mounted in thickened cedar oil.

This method gives excellent preparations, but in no way superior to those obtained by the method recommended by Plimmer for the demonstration of cellular inclusions in cancer.

Sections of mature clubroots are distinguished by groups of hypertrophic cells filled with closely packed spores. Preparations hardened in Hermann and stained with safranin show that many of the spores are blackened by the osmic acid. Those which do not show the black reaction stain diffusely with the safranin. The dense delimiting membrane in the unblackened spore can be detected by a slight difference in the refractive index. Within this an irregular outline, possibly representing the protoplasmic content of the spore, is distinctly visible. The spores present a most interesting appearance in preparations from which the osmic acid has been removed and treated with the following steps of Plimmer's method. In this case it has been found that the reaction of the spore to the iron hæmatoxylin is almost as capricious as its relation to osmic. Many of the spores are stained a diffuse blue-black, in which case the internal structures are obscured. A certain number are entirely resistant to the nuclear stain, in which case the irregular internal structure can be readily observed. (Fig. 9.) The spores are of uniform size and measure, as above stated, 3.33 μ. The amœbæ present the characteristics already given by Nawaschin. In the younger roots examined they are the predominating form and *in the very young outgrowths the spores are entirely absent.* The nuclei of the amœbæ stain with a protoplasmic stain, Plimmer's method, thus presenting an appearance extremely like that of the so-called "Plimmer's body," the characteristic cell inclusion of cancer. They vary considerably in size in the different amœbæ, but the nuclei in each amœba are of practically the same dimension. (Fig. 10.) We have detected nuclei as small as two micromillimeters in diameter and others five micromillimeters. Most of the nuclei are spherical in outline, but many oval or fusiform nuclei will be encountered. The protoplasm of the amœbæ in osmic acid preparations is either granular or coarsely reticulated, depending upon the success of the fixation. The outlines of the mature amœbæ can be readily determined, *but in the younger forms, as pointed out by Nawaschin, the protoplasm is intimately associated with the protoplasm of the plant cell and is often poorly developed, in which case the nucleus presents an appearance extremely like the cell inclusions in cancer. The central body stains somewhat more intensely than the nuclear membrane. The nuclear membrane of the smaller nuclei is, as a rule, poorly developed, in many cases scarcely distinguishable, in which case the nucleus presents the appearance of a vacuole in the protoplasm containing a highly refractive central body.* Many of the cells are completely filled with closely packed amœbæ, in which case the cell protoplasm is practically obliterated. The infected cells lie in groups, as described by Nawaschin, but these groups are usually surrounded by hypertrophic plant cells containing no parasites. The nuclei of the plant cells are readily distinguishable from the amœbæ,

PLATE IX.

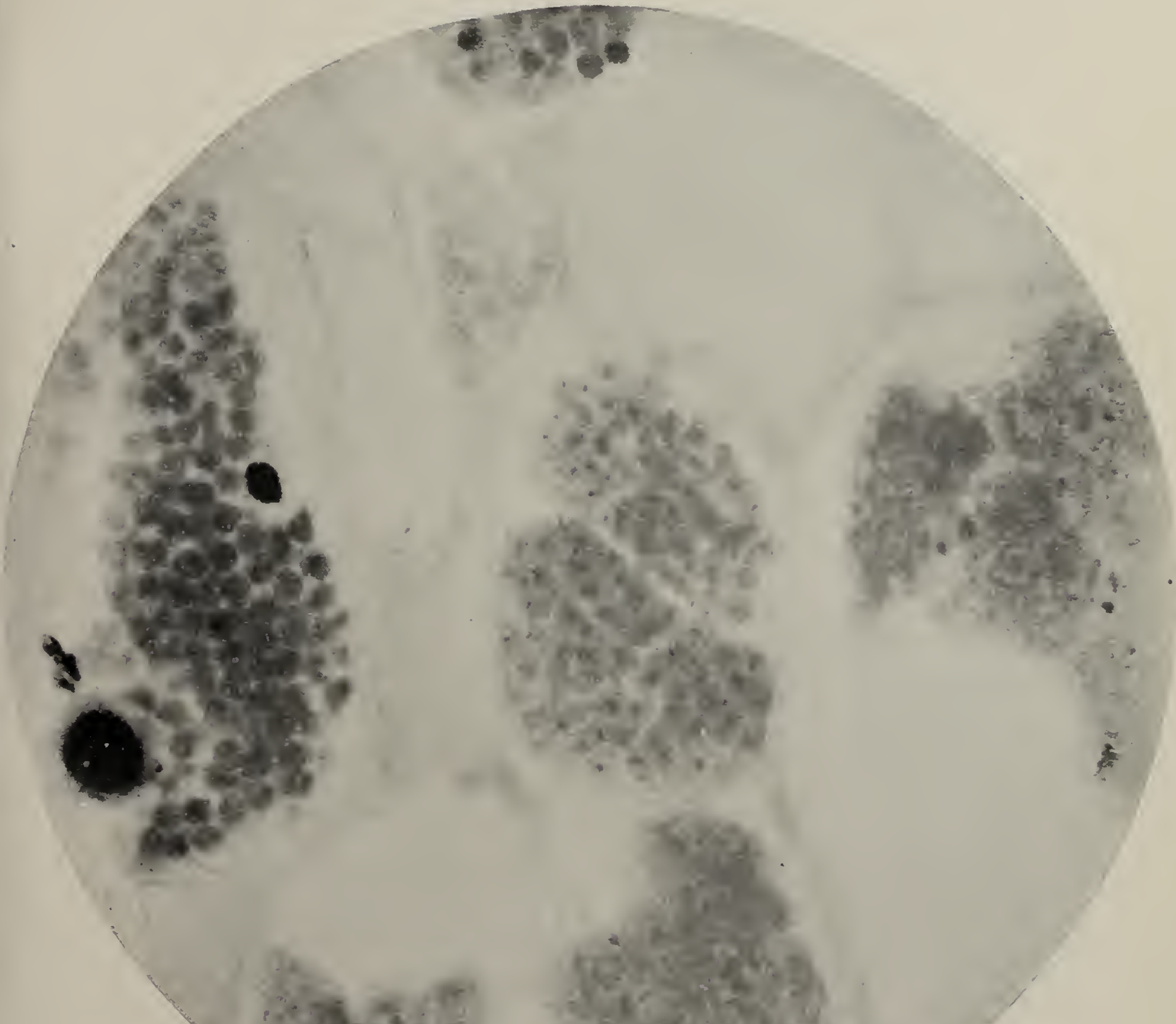

Fig. 9.

PLATE X.

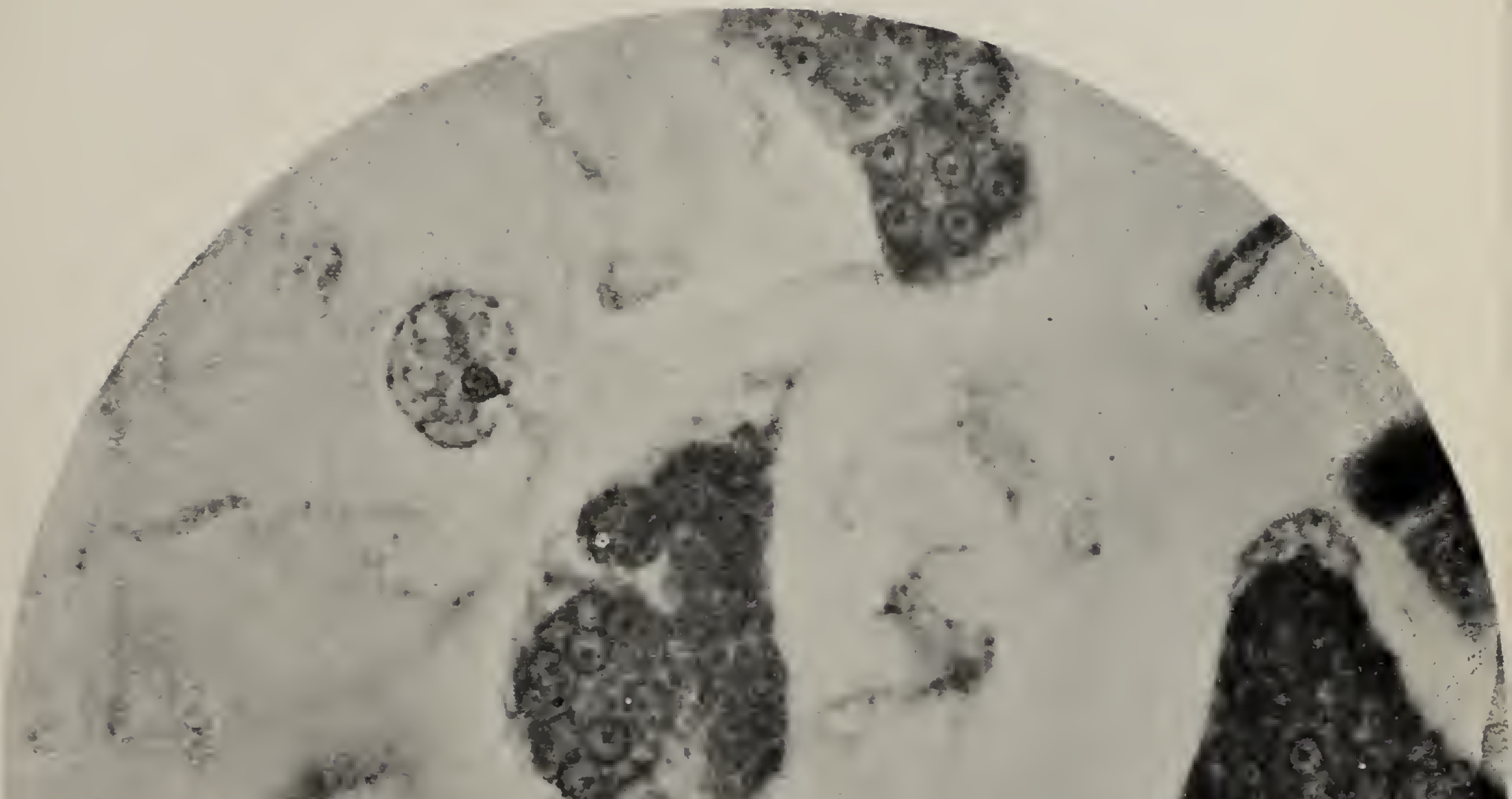

Fig. 10.

measuring on the average 10 to 12 micromillimeters in diameter. The amœbæ vary in size, the smaller measuring 4 or 5 micromillimeters, the larger 18 or 20 micromillimeters in their greatest diameter. The form of the amœbæ varies within wide limits, but the predominating form is oval or spherical. We have counted as many as 20 nuclei in one section of an amœba.

In the material thus far examined we have been unable to collect all the different forms described by Nawaschin, as evidence of nuclear division of the amœbæ, but divided central bodies with the grains of chromatin arranged in the plane of division are not infrequent. For this purpose young roots are required. The phases leading to spore formation are more readily discernible. Large amœbæ in which the nuclei are indistinct are extremely frequent. The outline of the amœbæ in this stage becomes indistinct (Fig. 9) and those adjacent to each other coalesce. Many of the cells are filled with granular masses of protoplasm nearly or completely filling the entire cell (plasmodia). (Fig. 9.) The nuclei of these masses of protoplasm, which are scarcely discernible, then divide by a process of regular karyokinesis, so that large masses are found filled with achromatic spindles, with well-defined medullary plates. At this stage the entire mass of protoplasm divides into irregularly shaped units surrounding the spindles, and these, according to Nawaschin, by a process of condensation form the spherical spores.

Infection of animals with Plasmodiophora.—Having determined the appearance of the spores, amœboid and plasmodial forms of the organism within the plant, both in the fresh state and in hardened sections, we have undertaken to repeat the experiments of Behla and Podwyssozki by implanting fragments of the tumor-like outgrowths of the infected roots beneath the subcutaneous tissue and into the peritoneal cavities of cold and warm-blooded animals. For this purpose we have employed guinea-pigs, rabbits, a few white rats and frogs.

The method of procedure was as follows: Fresh clubroot immediately after removal from the ground was washed for a period of time in running water, then carefully scrubbed with a brush to remove the dirt, after which it was thoroughly scrubbed in a 1:2000 sublimate solution, then thoroughly washed in sterile water. Observing the usual antiseptic precautions, sections of the tumor-like outgrowths 8 or 10 mm. in thickness were cut from the root, and with a sterile canula disks were punched from the cortical portion of the outgrowth, in each case avoiding the periphery. A slight incision was made through the skin in guinea-pigs and rabbits, the canula was introduced, the disk of clubroot pushed from the canula into the integument and the wound closed.

In all of the animals thus treated the wound healed rapidly without suppuration, except in a few cases where the clubroot was not sufficiently disinfected and bacteria were introduced. Where infection did not occur the results were uniform, whether the implantation was made in guinea-pigs or rabbits. In each case microscopic examination was made of the fresh material before implantation. Several animals were inoculated with very young outgrowths, the tissue of which, when examined with the microscope, showed only the presence of amœbæ within the plant cells, and in these cases *no infection resulted.* In the remaining experiments the microscopic examination showed the presence of many spores of the organism, which were likewise readily detected in the fragments of plant tissue remaining after removal from the animal at the termination of the experiment.

In all of these experiments there developed at the site of implantation a distinct tumor, which increased in size for a period of from four to six weeks, at which time they were usually the size of a hazelnut. From the sixth week on the tumors gradually decreased in size, and at the end of three months the site of the implantation was marked only by a small mass of connective tissue or had totally disappeared. The microscopic appearance of the fresh tumors during the stage of progression, i. e., to six weeks, was found on removal to consist of the remains of the implanted vegetable tissue surrounded by pinkish-white granulation tissue constituting the tumor. Scrapings from the cut surface of the tumor, avoiding the plant tissue, showed that the growth is composed of large cells of connective tissue or endothelial origin. These cells possess large vesicular nuclei containing one or more nucleoli. An occasional cell is met in which the nucleus is in some stage of karyokinesis. These large cells can be readily detected by numbers of minute, highly refractive fat droplets embedded in the protoplasm. Under high power, besides the nucleus the large phagocytic elements are found to contain within their protoplasm numbers of cell inclusions presenting the appearance of vacuoles containing central bodies. Each cell usually contains several of these inclusions, and in some cases the protoplasm is closely packed with the inclusions and fat droplets. Numbers of the inclusions present the appearance of the spores of Plasmodiophora when examined in the fresh state, i. e., spherical, greenish-yellow bodies of high refractive index, with a highly refractive central body. The derivation of the inclusions first mentioned from the typical spores of the organism can be readily traced. In the younger tumors the fresh scrapings show the presence of large numbers of leucocytes. Careful examination of the leucocytes shows that spores or inclusions within the leucocytes are extremely rare. In only one case have we found a spore within a leucocyte.

Sections through the surrounding tissue and the implanted vegetable tissue were hardened in sublimate, formalin and Hermann's fluid. Preparations hardened in Hermann and stained with Plimmer's method gave the most satisfactory results. An examination of growths of ten days or under reveal the following relations: The outline of the plant structure is well preserved and the relations of the contained spores and the remains of the amœbæ can be easily determined. At the margins the plant tissue is surrounded by a mass of coarse granulation tissue, more or less densely mixed with polymorph nuclear leucocytes. In uninfected cases the leucocytes are seldom present after the twelfth day, as pointed out by Podwyssozki. An examination of the plant tissue reveals the spores intact within the infected cells. In preparations from which the osmic acid has not been removed, the spore presents a characteristic appearance. Instead of the diffused blackening which characterizes the spore in the fresh state, in many spores the fat is gathered together in globules at the center. (See Fig. 11.) At the margin of the plant tissue the spores can be traced for a certain distance into the granulation tissue by the blackened droplets of fat which they contain. It is evident by studying the margin of the preparation that the spores rapidly lose their fat, whereupon they can no longer be distinguished in preparations stained with safranin. In preparations from which the osmic acid has been removed and the section stained with iron hæmatoxylin and neutral red (Plimmer's method) the chromatin of the spores stains a blue-black, and in the spores remaining in the plant tissue is irregularly arranged near the center of the spore. At the margins of the plant tissue the spores can be detected in the elements of the granulation tissue surrounding it. This tissue is made up of large connective tissue phagocytes with vesicular nuclei of varying size. The nuclei stain deeply and contain one or more nucleoli. The protoplasm is finely granular. In these cells the spores of the organism can be demonstrated, although in preparations from the tenth day on many show marked alterations in appearance. In early implantations the spores are readily recognizable, still containing chromatin and presenting the appearance found in the spores included in the plant tissue. The large phagocytic cells contain usually one or more. In some cases the protoplasm is filled with closely packed spores. In tumors from the twelfth day on many of the spores within the cells are found to have increased in size. The chromatin is usually absent and the protoplasm is contracted in the form of a central body surrounded by a clear space. (Figs. 12 and 13.) The periphery of the spore is indistinguishable from the protoplasm of the cell containing it, and the whole presents an appearance closely resembling certain cell inclusions in cancer.

The condition of the amœbæ within the plant tissue after implantation in the subcutaneous connective tissue of animals is worthy of especial attention. *In all preparations we have found that the amœbæ and all forms of the parasite,* with the exception of the spores, *have disintegrated.* The site of these forms is marked by masses of disintegrated protoplasm and chromatic material. By a careful comparison of portions of the plant tissue in each case before implantation, we have been able to determine that this is actually what occurs. The infection of the surrounding tissues is therefore owing to the presence of the spores, and the amœbæ are undoubtedly incapable of producing infection. This is shown by the cases in which we implanted fragments of young clubroot in which the organism had not

Plate XI.

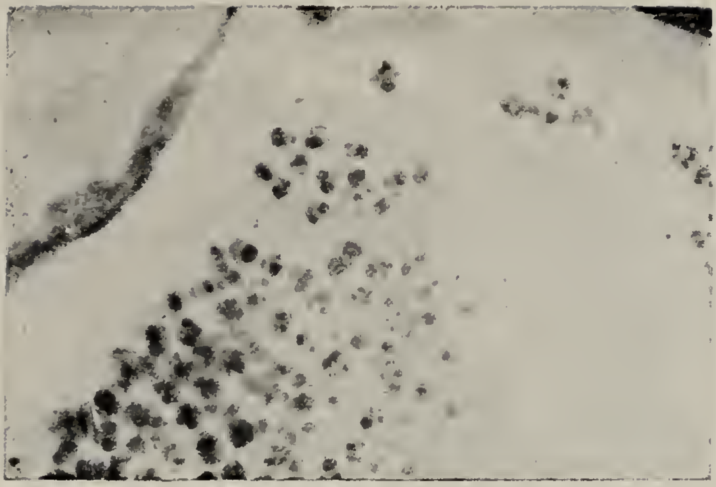

Fig. 11.

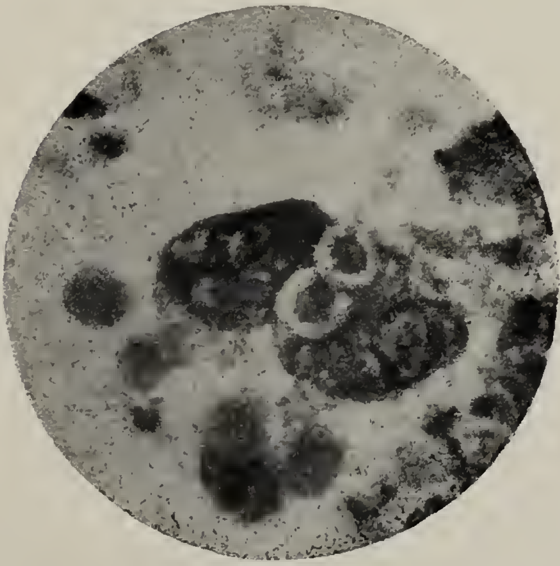

Fig. 12.

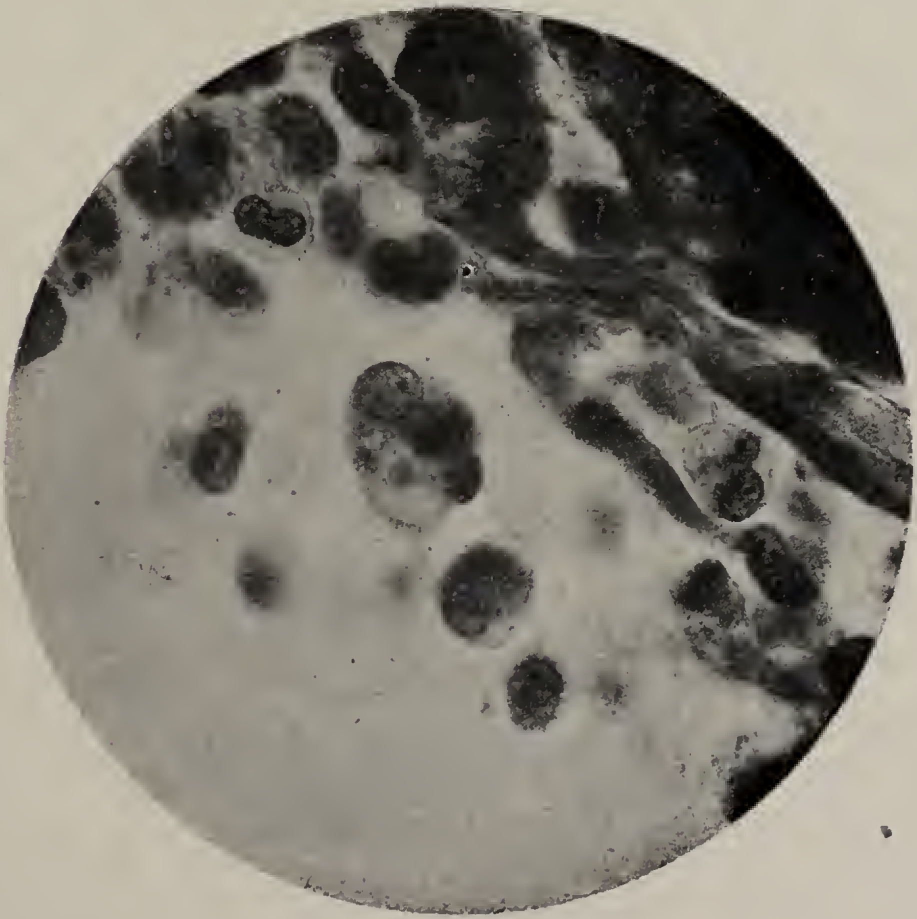

Fig. 13.

reached the stage of spore formation. In all of these experiments the fragment of plant tissue acted simply as a foreign body in the tissue, and after the usual period disintegrated and was removed. Macroscopically these cases could be readily distinguished from those in which the plant tissue contained spores, in which case granulation tumors the size of a hazelnut invariably developed. It is *highly probable in this case that the amœbæ perished with the plant cell, in which case the symbiosis referred to by Nawaschin is apparently complete.*

The nodules which result from the infection of warm-blooded animals by the spores of Plasmodiophora disappear in a period varying from six weeks to three months. They are therefore not malignant, the organism being ultimately destroyed by the activity of the cells in which they are found.

Our second series of experiments, in which we employed frogs, presented even more definite characteristics than those found in warm-blooded animals. In these experiments the necessity for preventing the introduction of bacteria was not as great as in the warm-blooded animals. The frog is apparently capable of overcoming bacterial infection with readiness. In these experiments the club-root was ground in a mortar in sterile salt solution. After determining that spores were present in the material it was strained through cheese-cloth to remove the coarse fragments of plant and then injected into the peritoneal cavity with a hypodermic syringe. Frogs examined at the end of seven to ten days show upon the surface of the peritoneum, especially in the omentum, whitish firm nodules, varying in size from a pinhead to a grain of rice and larger. In some cases the omentum is thickly infiltrated with larger and smaller nodules. Teased preparations from these nodules and scrapings show that they are composed of large endothelial cells containing spores of Plasmodiophora, and in scrapings made from the periphery of the nodules large numbers of coarsely granulated elements can be found. In frogs killed after the fifteenth day the granulated cells are greatly decreased in number. The granulated cells were never found to contain the spores of the organisms. The nodules were hardened in formalin, sublimate and Hermann's fluid.

Preparations hardened in sublimate and Hermann were best suited for the investigation of the spores, which in the formalin preparations were scarcely distinguishable. In sections hardened in sublimate and stained with hæmatoxylin-eosin the structure of the nodules is well-defined. It consists of accumulations of large cells with large vesicular nuclei of varying shapes. Many of the cells are oval, the majority are fusiform. (Fig. 14.) They are closely packed and in many cases arranged about centers, presenting an appearance not unlike the pseudo-pearls or whorls found in certain endotheliomata. (Fig. 15.) The nuclei are rich in chromatin; the cell protoplasm stains readily with eosin. On the surface of the smaller nodules which lie directly beneath the peritoneum the superficial endothelium can be readily distinguished from the cells of the nodules. The nodules frequently lie in the neighborhood of blood vessels, and from their relation have apparently developed in the sub-peritoneal lymph spaces. About the margins of the nodules the connective tissue stroma is densely infiltrated with polynuclear eosinophiles. (Fig. 16.) The cells forming the nodules can be readily distinguished in the connective tissue cells of the stroma. At the margins of the larger nodules the cells forming them penetrate into the surrounding stroma, in which they form cell nests sharply delimited from the surrounding connective tissue. Frequent karyokinetic figures are found within the nodules which have never been detected in the surrounding connective tissue. (Figs. 17 and 18.) In preparations stained with hæmatoxylin eosin the spores of Plasmodiophora are scarcely discernible. The protoplasm of the cells at the centres of the nodules presents a coarse granular appearance, and is apparently filled with rounded bodies of indefinite form which occasionally stain a pale rose tinge with hæmatoxylin. As will be seen by the further examination of preparations, these bodies are the spores of Plasmodiophora. In formalin preparations the spores are still more poorly defined and would undoubtedly escape notice. It is probable that by the use of this fixative Behla failed to detect the spores of the organism in infected cells.

In sections from material hardened in osmic acid, from which the osmic acid has not been removed, counterstained with safranin, the

Plate XII.

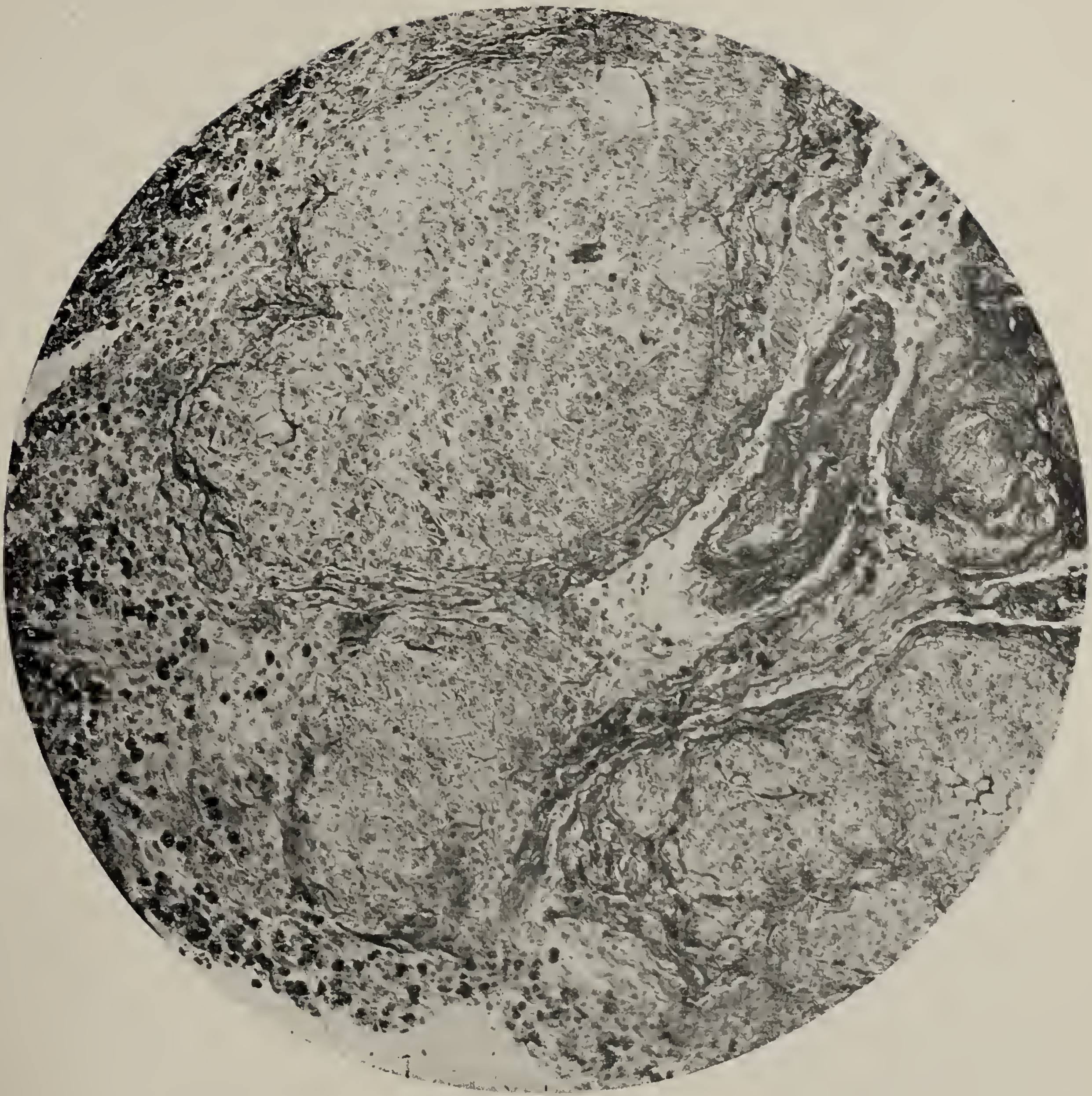

Fig. 14.

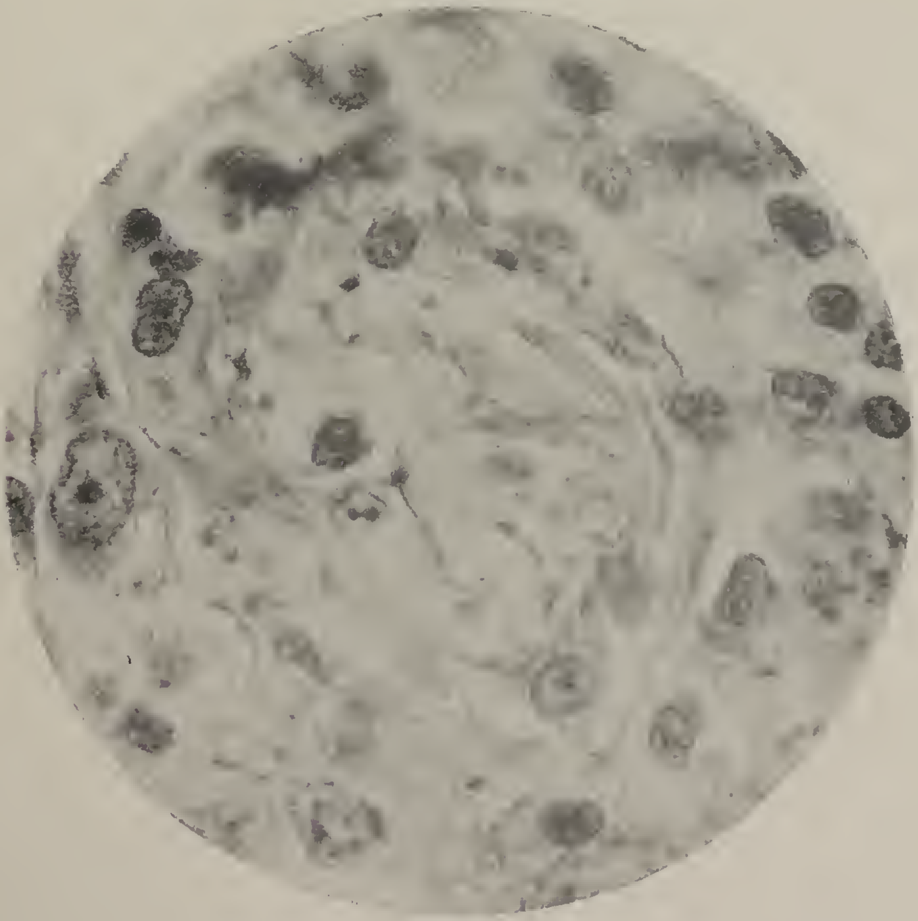

Fig. 15.

PLATE XIII.

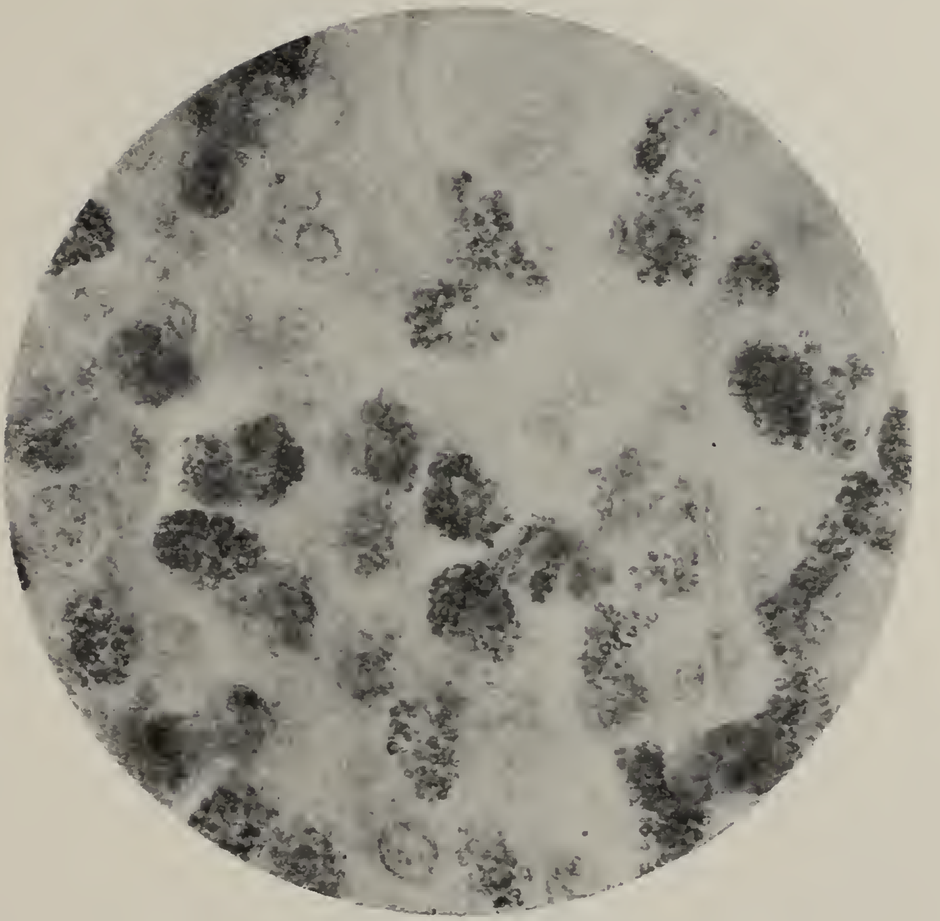

Fig. 16.

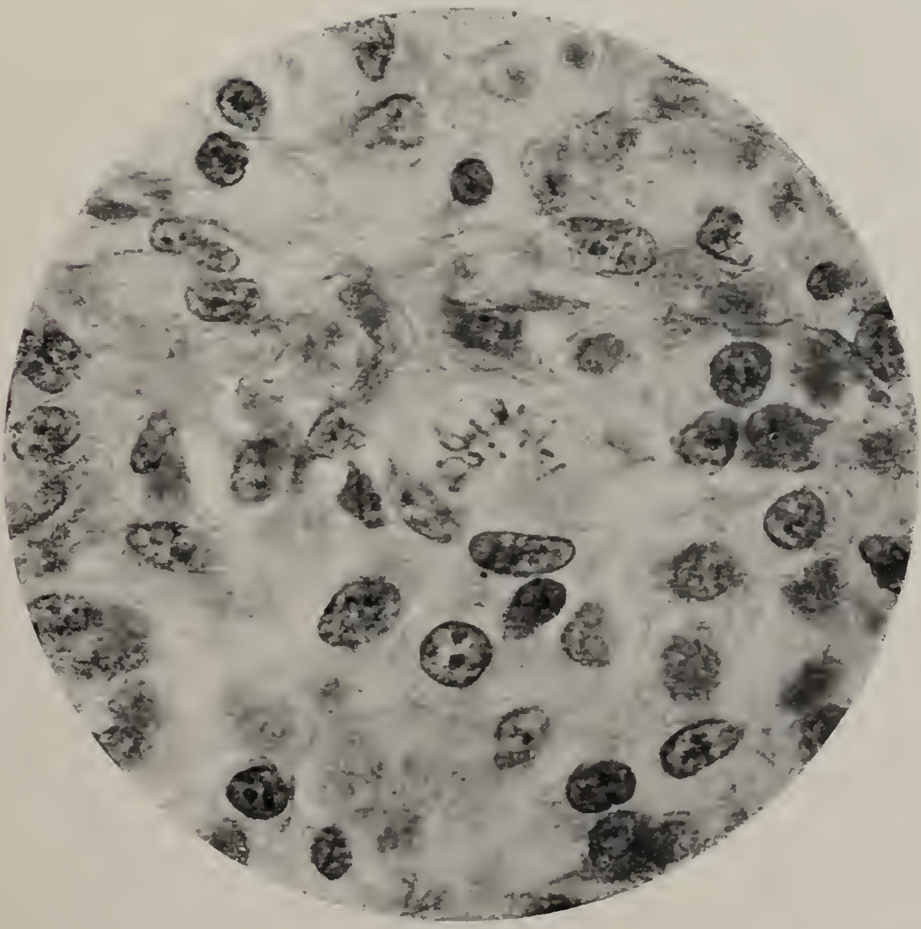

Fig. 17.

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Plate XIV.

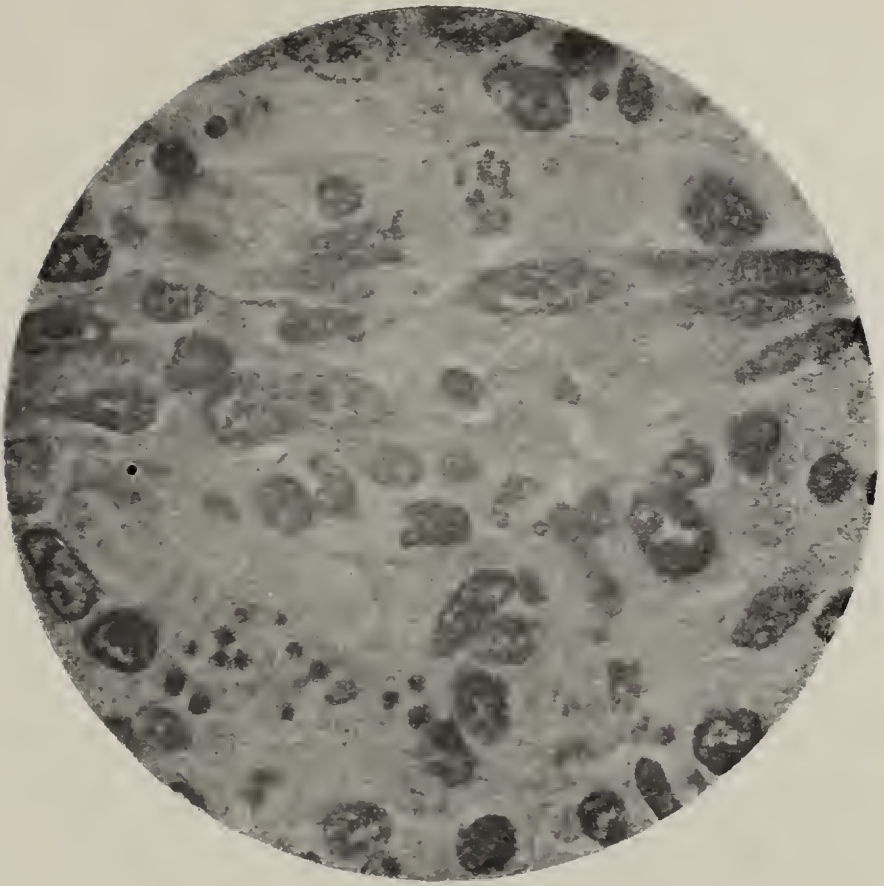


Fig. 18.

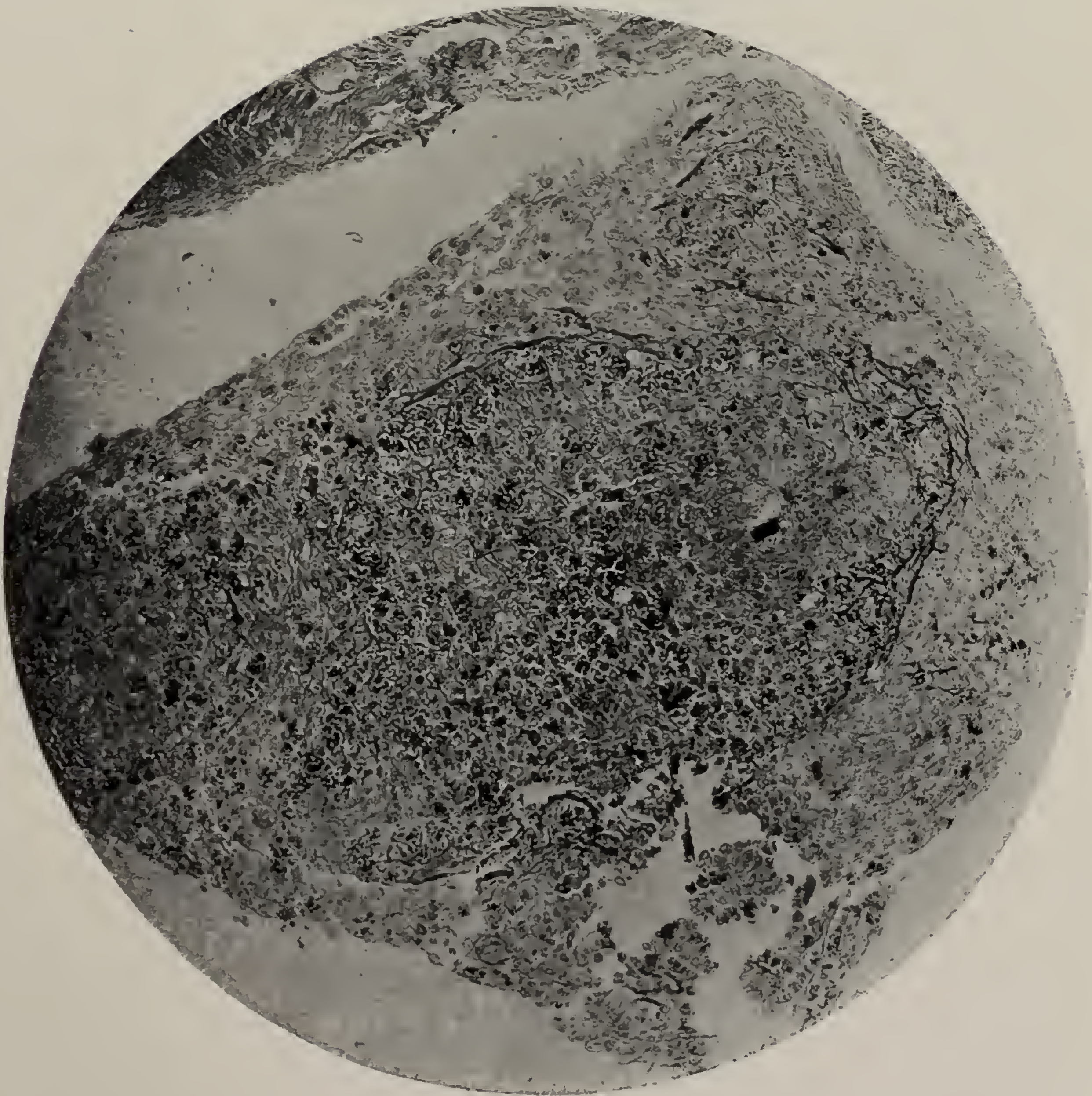


Fig. 19.

PLATE XV.

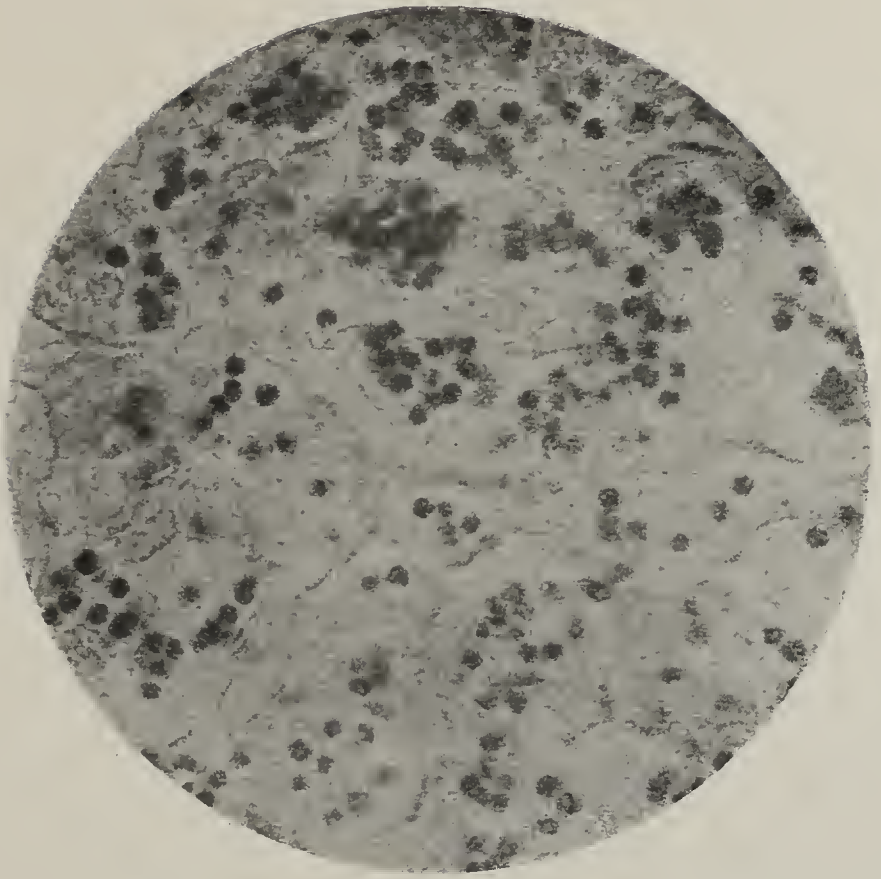


Fig. 20.

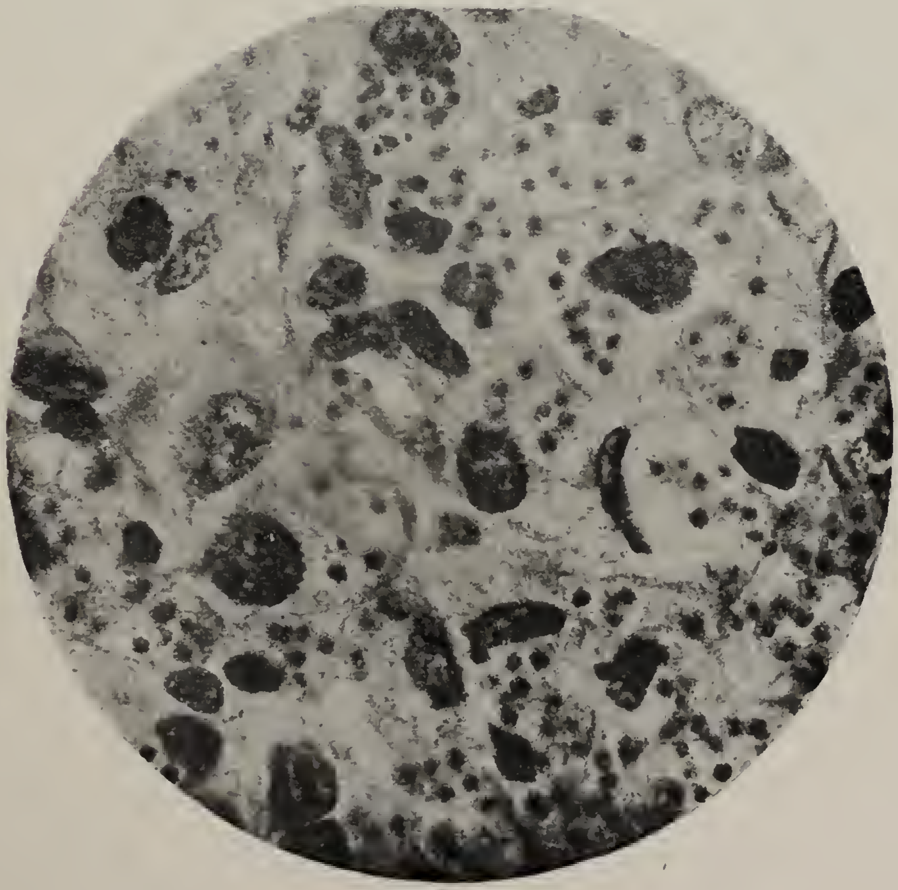


Fig. 21.

PLATE XVI.

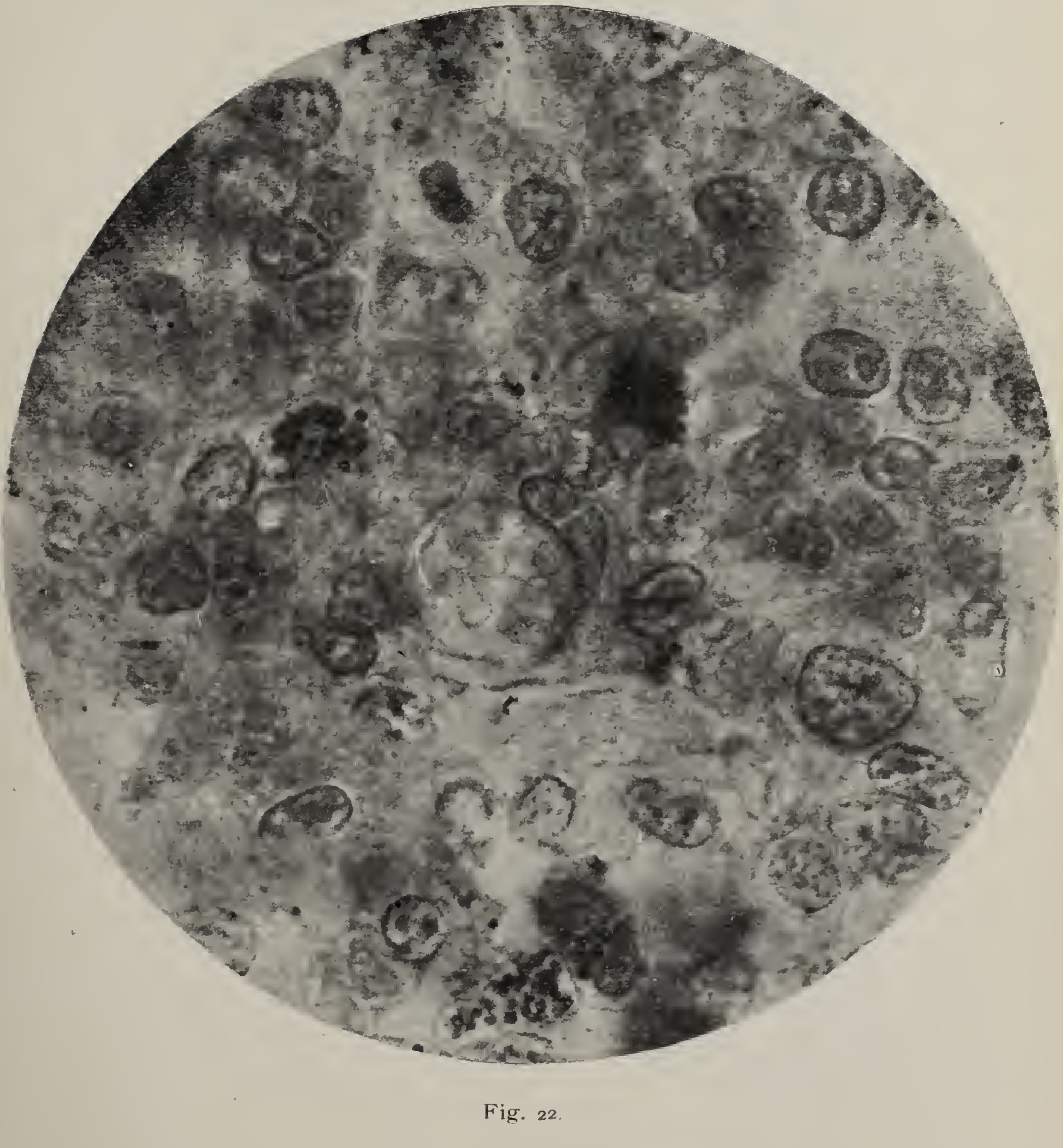


Fig. 22.

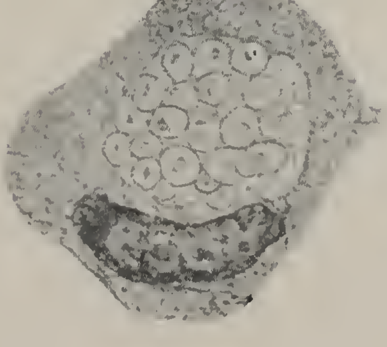


Fig. 23.

Plate XVII.

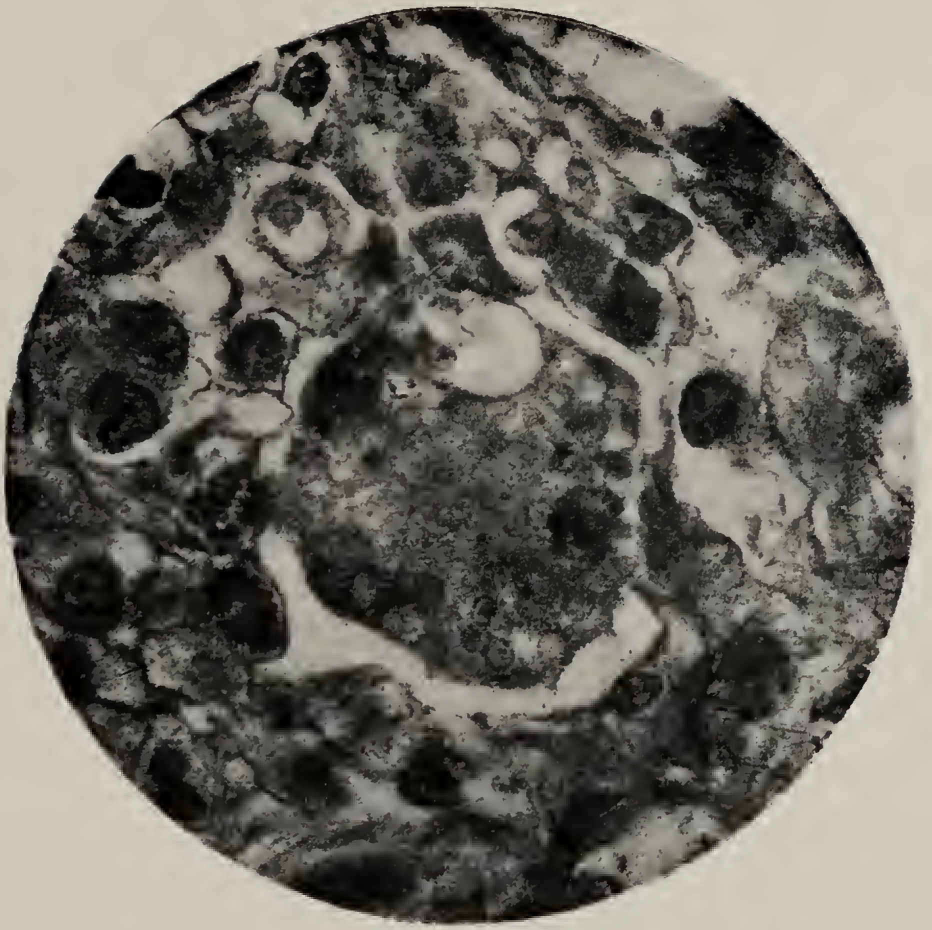
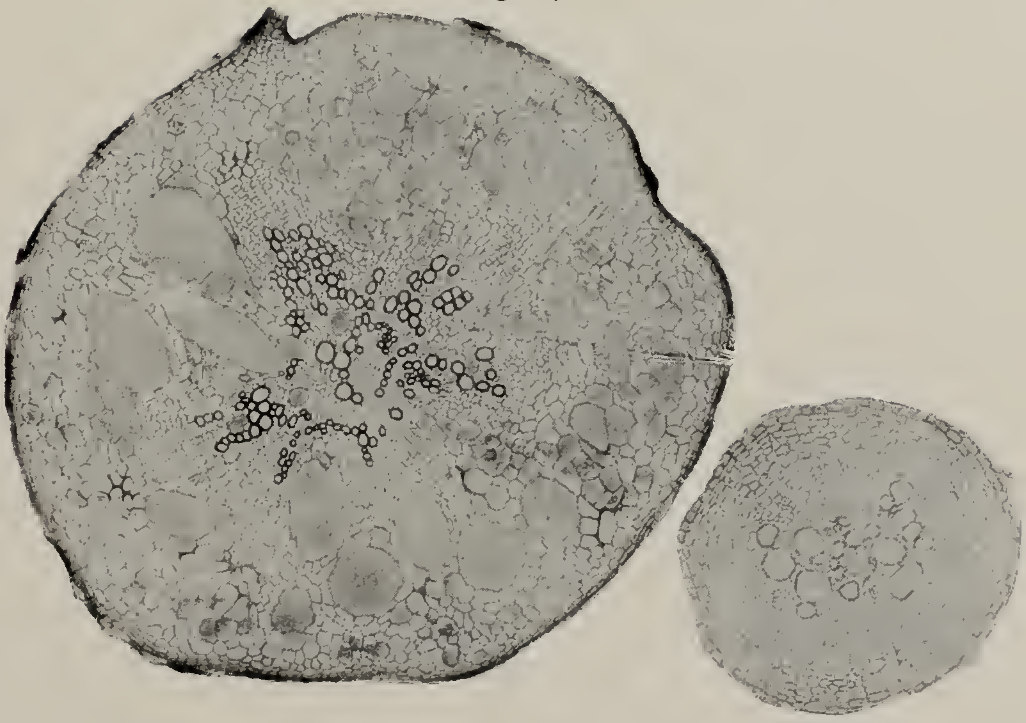


Fig. 24.



Infected

Fig. 25, after Woronin.

Normal

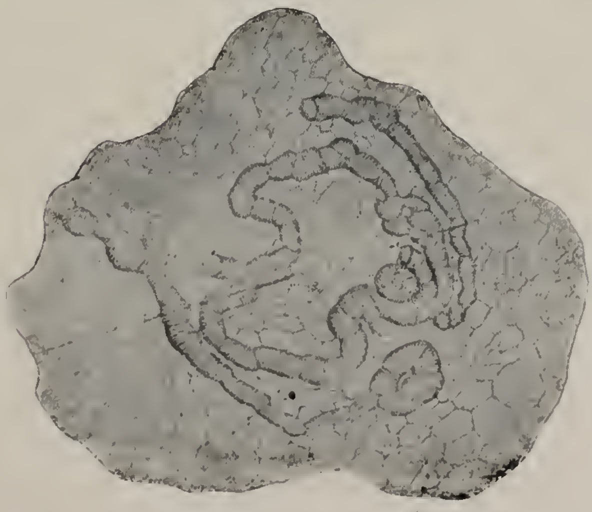


Fig. 26.

spores of the organism within the cells of the nodules can readily be detected as blackened, spherical bodies, approximately three micromillimeters in diameter. Under low power (see Fig. 19) the spores present the appearance of fat droplets blackened in the usual way by the osmic acid within the cells. They are most densely arranged at the centers of the nodules, the cells at the periphery containing a fewer number of spores than those forming the center. Under high power (Fig. 20), the fat is found to be most densely arranged about the periphery of the spore, and many spores are found which apparently contain no fat whatever. These shadowy forms, many of which apparently contain no internal structure, look like minute shadowy red blood corpuscles. In preparations hardened in sublimate and stained with Plimmer's method the picture presented is similar to that found in the hæmatoxylin-eosin preparations, with the exception that the nuclei are more sharply defined and many of the spores are found to contain chromatin. The differentiation of the cells of the nodules from the subperitoneal connective tissue stroma is more sharply defined. Karyokinetic figures are likewise more pregnantly stained and are found to be quite numerous. The characteristic nest-like arrangement of the endothelial cells is likewise clearly defined. (Fig. 14.) The granules of the eosinophiles of these preparations are capriciously stained, in many cells unstained, in others distinctly blue. The finer structures of the spores are best observed in preparations hardened in Hermann's fluid and stained with iron hæmatoxylin and neutral red. (Fig. 21.) In these sections it can be seen that many of the spores have lost their chromatin, while the majority possess an irregular chromatic structure at the center of the spore separated from the delimiting capsule by a narrow space. Many of the spores are entirely free from chromatin, and in some the chromatin is arranged about the periphery of the spores in the form of fine granules of uniform size. In a few cells we have seen structures of approximately five micromillimeters in diameter sharply defined from the protoplasm of the cell, containing uniform granules, staining deeply with the nuclear stain. These forms are rare and we believe them to be derived from the spores. Whether they represent a stage of further development or retrograde changes in the spores it is impossible to determine. Free chromatin granules of this type are likewise occasionally encountered, especially about the peripheries of the nodules. Occasionally spores are encountered which have increased in size, which are free from chromatic material, with an irregular, or spherical central body, again presenting an appearance closely resembling the cell inclusions of carcinoma. The granules of the granulated cells in these sections stain deeply with the iron hæmatoxylin. It is difficult to determine in many cases whether one is dealing with the minute spherical elements apparently derived from the spores, or free granules from these cells. In regions in which the granulated cells are abundant the differentiation is often impossible. A few sublimate sections were stained with Biondi-Heidenhain for the purpose of determining the affinity of the granules of these cells, which were found to stain a brilliant orange. A certain number of the larger endothelial cells near the centers of the nodules were found to contain great numbers of spores. In many cases their protoplasm was greatly distended and the spores were closely packed in large vacuoles presenting an appearance not unlike a cyst filled with spores. Fig. 22 represents a cell of this description from a section stained with Biondi-Heidenhain. The appearance of the spores in these cells is so like illustrations in the recent publication of von Leyden of inclusions found in carcinoma of the lung that the two should be viewed together. (Fig. 23.) The tendency of the cells of the nodules to coalesce often leads to the formation of giant cells. In one of our preparations giant cells with the spores arranged about the nuclei were occasionally encountered. The relation of the spores to the nuclei of the cells is often of interest. *In many cases, especially in the smaller cells composing the nodules, the nucleus of the cell will be found to be pushed to one side and curved about the spore, giving it an appearance closely representing certain illustrations of centrosomes.* In the giant cells the spores are commonly arranged about the nuclei, the center of the giant cell being free. (Fig. 24.) In sections stained with Mallory's connective tissue stain the cells of the nodules stain a brilliant red or orange, whereas the connective tissue stroma stains a brilliant blue.

Fine fibres of connective tissue can be found extending into the smaller nodules, but the larger nodules are, for the most part, free from stroma, except about the margins where the cells of the nodules infiltrate the surrounding connective tissue structure from which they were sharply defined.

Frog III, killed after 47 days, shows upon the surface of the liver the mesentery and omentum, nodules varying from the size of a pinhead to that of a large grain of rice. These are firm and white and of a little greater consistence than those found in Frog I. Fresh examination shows these nodules to be composed for the most part of large, spindle elements in which an occasional vesicular structure, varying in size from three to six micromillimeters, can be found. Many of these vesicular structures contain central bodies which are undoubtedly spores of Plasmodiophora. In sections hardened in sublimate and stained with hæmatoxylin-eosin the tissue of the nodule is found to be composed of large spindle elements with vesicular nuclei. Viewed under low power these cells are seen to be arranged about centers, presenting an appearance like the whorls of cells found in certain sarcomata. Occasional giant cells are present, measuring as high as 30 micromillimeters in greatest diameter. These contain many nuclei, as many as 18 or 20 being counted in one cell. These are usually arranged about the periphery of the cell or in a group at the center. Careful examination of the preparation for spores shows that occasional cells contain shadowy spherical bodies, usually without other structure, but occasionally with a central body. Many of these spores are as large as six micromillimeters and present the characteristics of intracellular inclusions found in carcinoma. Occasionally a granulated cell can be found at the margin of the nodules. The cells of the nodules do not stain as deeply as those of Frog I, and the intracellular connective tissue stroma is more prominent. Embedded in one of these nodules are two cystic structures of spherical outline measuring eight micromillimeters in diameter. Their margins present a beaded or radiating appearance, and each contains a mass of unstained protoplasm of irregular form, nearly filling the cyst cavity. The appearance of these structures is so striking as to leave absolutely no doubt that they *represent the spore* *cysts of Plasmodiophora with well-developed swarm spores within them.*

From these experiments it will be seen that the spores of Plasmodiophora, when injected into animals, are capable of causing granulomata composed largely of endothelial cells which present certain characteristics distinguishing them from the ordinary infectious granulomata, and which give them an appearance more closely resembling endothelioma and sarcoma than the granulomata usually encountered. From a careful survey of our preparations we are able to confirm the conclusions of Podwyssozki given on page 27, and further to add that the observation in Frog III of perfectly developed spore cysts inclosing what seem to be well-developed swarmers shows that the organism is capable of development to this stage within the tissues of cold-blooded animals. These nodules, as stated by Podwyssozki, ultimately subside and resemble endotheliomata only in their histological characteristics. The spores, both in warm and cold-blooded animals, undergo certain alterations in the tissue, after which they closely resemble certain of the bird's-eye inclusions in malignant tumors.

The large numbers of eosinophiles noted about and in the nodules in the animals infected with spores of Plasmodiophora call to mind the similar accumulations found in the lymphomata of Hodgkin's disease. The spores of Plasmodiophora in the tissues of both warm and cold-blooded animals correspond in size and appearance very closely to certain structures described by Flexner* in lympho-sarcoma which he suggested were protozoa. It is possible that a further investigation of Plasmodiophora and allied organisms may throw light on the nature of the spherical bodies described by the above author.

The analogy between clubroot and cancer.—The application of the facts pertaining to the distribution of the amœboid form of Plasmodiophora in clubroot, as determined by Nawaschin, to the nature of the proliferation of the cancerous epithelium as it is now under-

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*Multiple lympho-sarcomata, with a report of two cases. A contribution to the infectious nature of lympho-sarcoma. *The Johns Hopkins Hospital Reports,* Vol. III, 1894, p. 153.

stood in man, reveals the following status: The outgrowths of clubroot are the result of proliferation and hypertrophy of the cells of the cortex. The cells of the medullary portion of the plant are never infected. Inasmuch as the infection of the plant can occur during any stage of its development, this must be attributed to a selective faculty on the part of the swarm spores at the time of their entry into the plant tissue. Examination of sections of young clubroot in which the amœboid is the predominating form of the organism discloses the characteristic arrangement of the infected cells as pointed out by Nawaschin. A similar distribution can be found in the beautiful illustrations of Woronin. (Fig. 25.) The infected cells are in every case arranged in groups, and serial sections show that each infected cell is at some point adjacent to another infected cell, the whole group surrounded by hypertrophic cells in which no parasites are to be found. This peculiar arrangement of the cells and the fact that the amœbæ have never been detected in the act of penetrating the wall pits of the cells has led Nawaschin to the conclusion that the *distribution of the parasites is owing exclusively to the proliferation of one or more primarily infected cells.* That he has found dividing plant cells containing amœbæ and that the amœbæ are in this way distributed is beyond doubt. The distribution of the groups of infected cells throughout the cortex is undoubtedly the result of multiple infection. An examination of the hypertrophic cells of the cortex surrounding the groups of infected cells, but free from parasites, reveals the presence of an occasional karyokinetic figure. From this it would seem that the amœbæ, themselves incapable of penetrating from one cell to another, liberate some soluble toxic substance which, diffusing into the surrounding cells of the cortex, leads to hypertrophy and occasionally to proliferation. This toxic agent, whatever its nature, is likewise capable of causing proliferation of the cells forming the vessels of the plant, which in some cases proliferate to such an extent that in the neighborhood of the infected cells they are frequently tortuous, coiled and otherwise distorted. This condition is admirably shown in Fig. 26, from Woronin. In no case have parasites been found within the cells of the vessels. On examination of sections of clubroot in which the amœbæ have passed through the plasmodial phase terminating in spore formation, it will be noted that the hypertrophic character of the surrounding parenchyma cells has largely disappeared. It would thus seem that the toxic action of the parasite is confined to the vegetative stage. The proliferation of the cells in the tumor can therefore be divided into two classes: first, infected cells; the stimulus for the division in this case is probably toxic, but the proliferation is no doubt for the purpose of throwing off the parasite, which is seldom successful, as the amœbæ proliferate much more rapidly than the host cell, and by the time the process of proliferation is terminated in the plant element, the entire cell being filled with amœbæ, a certain number remain in each of the daughter cells formed by the division. The second order of proliferation is that affecting the surrounding structures. This is purely toxic and appears to subside when the proliferative phase of the organism terminates. This affects the adjacent cells of the cortex and the cells of the vascular system. If fragments of clubroot containing amœbæ are transplanted upon the cortex of an uninfected plant of the same variety, a tumor will develop which is the result of proliferation of the infected transplanted cells, combined with hypertrophy and a certain amount of proliferation in the surrounding parenchyma cells of the plant upon which the infected cells have been implanted. There is no doubt whatever, if cells of the tumor in the first case could be selected which contained no parasites, no tumor formation would result in the inoculated plant. It will thus be seen that in order to produce clubroot by inoculation infected cells must be transplanted. In this case likewise both cell and parasite must be transplanted intact. Attempts to produce inoculation tumors in plants with the amœbæ alone have thus far proved negative, and so far as our present knowledge extends, a primary infection can only be induced by the introduction of the flagellate form of the organism after the germination of the spores in the earth. The endothelial connective tissue tumors which result in animals from the implantation or inoculation of the spore form of Plasmodiophora from the plant, are probably largely the result of toxic substances contained within the spore, acting upon the cells of the animal. The transient leucocytosis likewise strongly suggests this explanation. As the organism is incapable of accomplishing a reproductive cycle when implanted under these conditions, the process is not progressive, although the spores are found shortly after implantation embedded in the cells which have proliferated about them.

The frequent occurrence of karyokinetic figures in the cells of the animal forming these tumors indicates that the mere presence of the spores is capable of inducing proliferation of certain elements in the animal. It must be noted that this toxic activity of the spores is exerted in a selective way. The cells surrounding the implanted spores, with the exception of the primary (transient leucocytosis) are all of one character and apparently derived from one source. Instead of a heterogeneous mixture of elements, such as we find in granulation tissue, these nodules are all of the same type, and in the frog present an appearance in the progressive stage closely resembling endothelioma.

If in the light of the ascertained facts governing the relation between Plasmodiophora and the plant cell, as above stated, we turn to the conditions as we find them in cancer in man and animals, a series of analogies can be developed which indicate that in Plasmodiophora we have a parasite, the cause of a specific tumor, which in its relation to the tissue which it infects fulfils many of the conditions which must be required of a parasite before it can be accepted as bearing a direct etiologic relation to cancer. The investigations of Hauser, Peterson and others have demonstrated that in primary epithelial growths a direct continuity with the epithelium from which the tumor is derived can be readily traced. This has been accomplished by means of serial sections and wax models. These investigations have likewise shown, especially in epithelioma, a form of tumor which has been most frequently subjected to this form of examination, that the proliferation frequently begins at several points, as a rule not far distant from one another. Starting at these points the tumor spreads into the surrounding structure and through the medium of the lymph spaces, carcinomatous cells are carried into the circulation, when the phenomenon of metastasis formation supervenes.

Associated with the proliferation of the epithelium is with rare exceptions a reaction of the adjacent connective tissue. This is evidenced by the well-known round celled infiltration at the margins of many carcinomata, by the extensive development of a connective tissue stroma and by the frequent appearance of karyokinetic figures in the nuclei of the connective tissue elements forming it. The evidences of mitosis in the stroma of the tumor are never so frequent as in the proliferating epithelium of the tumor proper. The structure of the newly formed stroma of the tumor likewise includes a more or less well-developed vascular system. That the specific factor of the tumor formation is not in the stroma is evidenced by the fact that metastatic connective tissue proliferation is not a phenomenon of the dissemination of carcinoma. On the other hand, in the regions where metastases from the primary tumor develop without regard to the tissue or organ in which this occurs a stroma derived from the adjacent connective tissue results from the presence of the epithelial elements of the tumor. It is thus seen that the epithelial elements carry with them and elaborate some agent capable of inducing not only the primary reaction of the connective tissue as expressed by the frequent round-celled infiltration at the margin, but an extensive proliferation of the connective tissue structure which, both in the primary tumor and in the metastases, leads to the development of a more or less well-defined connective tissue framework which forms no inconsiderable proportion of the new growth. It is generally conceded that the cells of carcinoma in a given case are derived by proliferation from groups of cells which have primarily undergone the cancerous transformation. In most cases the cell, once so transformed, proliferates indefinitely, and transported through the medium of the circulation to other regions of the economy, continues its proliferative activity, and in this way the metastases are formed.

It is, however, a well known fact that every cancer cell is not capable of proliferating indefinitely. This is first shown by the large number of cells which present high grade degenerative changes, in many cases the forerunners of complete disintegration. It has likewise been noted that all tumor elements are not capable of producing metastases, even when transported under exactly the conditions ordinarily leading to this result. For instance, cancer cells have frequently been found in the pulmonary capillaries and in the ductus thoracicus, regions in which metastases frequently develop but which show no evidence of proliferation, although present in large numbers. It will thus be seen that every cancer cell is not capable of continuing indefinitely the cancerous process.

Inasmuch as in clubroot we have no metastases, the outgrowths in this case could at best only be compared with the primary tumor in cancer. We have seen that the tumor in clubroot is composed of cells containing parasites and hypertrophic cells immediately adjoining them. The infected cells when transplanted are capable of continuing the growth. The hypertrophic cells, which in all other respects closely resemble them but which contain no parasites, are naturally incapable of producing an infection. We have seen, by analysis, that the primary growth in cancer presents a certain analogy in that it is composed of cells capable of continuing the proliferation when transported to distant regions, and other cells which morphologically closely resemble them, which are incapable of producing metastases. *For this reason we must conclude that if a parasite were the basis of the cancerous proliferation, it would not necessarily be present in every epithelial cell forming the tumor.* It must necessarily be seen that the cells which are incapable of continuing proliferation must either contain no parasites or have reached a stage in which it is itself incapable of further proliferation, in which case the organism has in all probability passed into some permanent spore-like form, a condition in which it would be incapable of reinfecting epithelium or other cells of the organism without passing through some ectogenous cycle of development. This is exactly the case in Plasmodiophora, and it may be pointed out that cell inclusions in cancer, which are held by certain investigators to be of parasitic nature, are not present in all the cells even when most frequent. To this must be added, however, that the inclusions in cancer which so closely resemble the amœboid form of Plasmodiophora at best represent but one form of the parasite; that at least occasional spores must be accounted for, and that the organism on its entry into the epithelium is probably present in some form which, with our present methods, we are unable to recognize. The fact that the swarm spores of Plasmodiophora when injected into the tissue, so closely approximate in their appearance certain normal tissue elements that they are unrecognizable, indicates that such a supposition is reasonable.

As the specific factor in cancer, having once developed in certain cells, remains identified with them, being handed down through proliferation of these cells, it must greatly increase in amount. It has been suggested that this specific factor is of a toxic nature, but no explanation has been offered as to how a small amount of toxin, starting in a few cells, can continually reproduce itself. From what we know at present of toxins there is absolutely no ground for this supposition, and even in the case of enzymes or ferments, which are sometimes referred to, we have nothing analogous to the conditions in cancer. There is no doubt that the development of the stroma in cancer must be attributed to the action of a toxin since this action is local and undoubtedly results from the presence of the cancer cells, but inasmuch as the mere proliferation of normal cells does not lead to the elaboration of a toxic substance, we must assume that this toxic substance is directly associated with the essential factor which causes the cancerous transformation of the epithelium. As the essential factor in cancer increases with the proliferation of the cells, or in other words, reproduces itself, and we know that no toxin is capable of this, we arrive at the conclusion that the presence of an organism in the epithelium offers the best explanation of the phenomena as they occur. An organism of the protozoan group, especially one more or less distantly related to the Mycetozoa, and therefore comparable to Plasmodiophora, would best fulfil these conditions. That such organisms upon infecting the tissue elements of a higher animal do, in all probability, elaborate toxic substances is shown by the facts in Plasmodiophora. A similar state of affairs has been described by Pianese, who observed atypical karyokinetic figures in the epithelial cells of the urinary tubules of the guinea-pig which were infected by a protozoan parasite.

We have seen that in Plasmodiophora the parasite divides until the demands upon the cell are such that it likewise divides. This continues until by repeated divisions the parasite has completely filled the cell and exhausted the nourishment, whereupon the organisms are transformed into permanent spores. These spores are incapable of reinfecting the cells of the plant until they have passed through the ectogenous cycle, in which they lie during the entire winter in the ground, liberating swarm spores with the advent of spring, which, entering fresh plants, lead to reappearance of the disease.

The infection in Plasmodiophora destroys the growth of the plant, and in a certain sense may be looked upon as a malignant infection. It is seen that the organism remains in the amœboid stage and in a state of symbiotic existence with the host cell until it is exhausted. This is dependent upon the relative rate of proliferation. It is possible to conceive that in cancer the greater proliferative power of the epithelial cell might place it on a footing with the parasite, which would enable it to proliferate rapidly and indefinitely, in which case only exceptionally unfavorable conditions would lead to the development of spores. These spores, even if present in the tissue, would be incapable of infecting uninfected cells without passing out of the organism and through some ectogenous cycle. They would likewise be incapable of infecting the tissue cells of other animals or individuals when transplanted without the interposition of this cycle, as is the case in Plasmodiophora.

The parasite, once having entered into this symbiotic relation with the cell, would perish with the cell unless it had taken on the permanent spore formation just mentioned. For this reason it would be impossible to produce tumors even in animals of the same type without the transplantation of both cell and parasite, which applies both to the transplantation experiments as carried on in animals and the relations as they exist in Plasmodiophora. The few cases in which inoculation of animals with peritoneal fluid from man has been followed by epithelial proliferation cannot be compared directly with the conditions as they occur in nature. In the first place, while these tumors closely resemble malignant epithelial tumors as we find them in man and animals, they have in no case proved truly malignant;

have never led to metastasis, and have ultimately been overcome by the animal. They may fairly be compared to the endothelial nodules which develop in frogs around the implanted fragments of clubroot. The conditions in this case are entirely abnormal, and the organism at best passes through but a portion of the necessary cycle. The nodules obtained in the liver of a dog by intravenous injection of peritoneal fluid from cancer of the peritoneum in man indicate the correctness of this explanation of these rare occurrences.

In conclusion it may be fairly stated that there are inclusions in cancer which, viewed in the light of Plasmodiophora, are best explained as parasites; that a comparison of the conditions found in clubroot with those found in man show that we are now acquainted with a parasite capable in many ways of fulfilling the conditions required of a parasite for cancer. Our efforts should therefore be directed to the more accurate determination of the nature and distribution of this too little known class of organisms, and to the determination if possible of an ectogenous cycle for the parasite of cancer, which includes the possibility of an intermediary host.

February 1, 1903.

ON THE EVIDENCE OF NUCLEAR DIVISION OF CERTAIN CELL INCLUSIONS (THOMA, SJÖBRING, PLIMMER'S BODIES) IN CANCEROUS EPITHELIUM.

By Harvey R. Gaylord, M. D.

Since the advent of cellular pathology the attention of investigators has been directed to certain bodies embedded in the cytoplasm of the cells of malignant tumors. The difficulty of determining the nature of these inclusions is well evidenced by the extensive literature pertaining to the subject, but which even to-day leaves the significance of at least a number of these structures in doubt.

The bodies with which we wish to deal in this paper are spherical or slightly oval structures, from .004 to .01 mm. in size, or in exceptional cases of still greater dimensions. They invariably contain a small body, usually centrally placed. With the exception of this central body the resting inclusions present an appearance not unlike that of a vacuole, as no structure other than the central body is demonstrable. The entire structure is embedded in the protoplasm of the cancer cells and, where the body is of greater dimension, the cell nucleus is commonly pushed to one side and curved about it. The staining reaction of these inclusions is dependent largely upon the fixative employed. In material hardened with formalin and stained with Delafield's or iron hæmatoxylin, the central bodies of a certain number of the inclusions take the nuclear stain. Where osmic acid is used as a fixative, in which case the inclusions are most definitely demonstrated, the central body of the inclusions stains as does the protoplasm. These bodies may be found unstained in fresh material directly after removal of the tumor.

Although, as will be seen from the historical review, these bodies have been repeatedly observed and in many cases accurately illustrated, they have in recent times through the exhaustive article of Plimmer attracted renewed interest. In several of the recent publications on the subject, the bodies have been spoken of as "Plimmer's bodies." Von Leyden, one of the most recent writers on the subject, has called attention to their similarity in appearance to the eye of a bird, for which reason they are coming more and more to be spoken of as "bird's-eye inclusions," a not inapt expression.

Historical.—On review of the literature it becomes evident that many observers have seen and illustrated the inclusions above described. As early as 1847, in the first volume of Virchow's Archiv, is found an article by Virchow, entitled "Zur Entwickelungsgeschichte des Krebses, nebst Bemerkungen über Fettbildung im thierischen Körper und pathologische Resorption," in which on Plate II, Fig. 5, the cells shown at *a, g, i, l, n,* and *k* undoubtedly contain inclusions of this nature. It is interesting to note that the author represents cells in the fresh state. Virchow regarded these bodies as modifications of the nuclei of the cancer cells.[1]

In Vol. III of Virchow's Archiv (Die endogene Zellenbildung beim Krebs), Virchow further describes cell inclusions, of which those illustrated on Plate II, Figs. 2*c*, 4*a*, 2 and *d*, appear to represent bird's-eye inclusions, although the illustrations are not sufficiently characteristic to remove a possible doubt. (See Fig. 1.)

Soudakewitsch[2] in two articles published in 1892, gives repeated illustrations of these bodies. Plate V, Fig. 6, carcinoma of breast, represents a body apparently undergoing division with four central bodies arranged in the form of a cross. Fig. 2, Plate VI, also carcinoma of the breast, shows multiple inclusions, the one above and to the right presenting a definite phase of division. (See Fig. 2.) Fig. 27, Plate VI, carcinoma of the breast, hardened in Fleming and stained with safranin, represents a resting body. Plate VII, Fig. 17, carcinoma of the pancreas, hardened with osmic acid and stained with hæmatoxylin, represents a rosette form. Fig. 19 represents a cell with multiple inclusions from the metastases of cancer of the pancreas. In a second article in August of the same year he describes further inclusions. That of Fig. 7, Plate XII, from a primary case of carcinoma of the pancreas, illustrates seven definite inclusions, with central bodies forming a rosette. (See Fig. 2.) Fig. 15, from a primary carcinoma of the liver, stained with osmic acid and hæmatoxylin, represents a group of these bodies, and in Fig. 17, a body undergoing division is represented from a carcinoma of the pancreas. (See Fig. 2.) Fig. 21 again represents a group of similar inclusions from a case of cancer of the liver.

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[1] The cell inclusions described by Langhans in *Deutsche Chirurgie von Billroth und Lücke,* 1886, in the epithelial cells of carcinoma of the glands of Kupfer, do not belong under this heading, although Lubarsch (*Pathologische Anatomie und Krebsforschung*) wishes so to classify them. The bodies described and illustrated by Langhans are round, well-defined bodies, from the size of a nucleus to that of a large vacuole. They were, however, filled with granular material and surrounded by deeply stained membranes. Many of them were drawn out in tubular or branching form. It will be seen that this description in no way conforms to that of the bird's-eye inclusions.

[2] Soudakewitsch.—Recherches sur le parasitisme intracellulaire, etc. *Annales de l'Institut Pasteur,* 1892, March 25, No. 3.

Sjöbring[1] gives a most accurate and consistent description of bird's-eye forms of inclusions. In Figs. 1, 12 and 14 he illustrates characteristic forms. (See Fig. 3.) Thoma[2] describes bodies somewhat similar to those of Sjöbring. His original article is unaccompanied by illustrations. Illustrations given in his Lehrbuch f. path. Anatomie, 1894, p. 169, leave some doubt as to their identity. Fig. *a* apparently represents a bird's-eye inclusion, and those shown in the large figure above likewise appear to be of this nature. Figs. *c* and *d* of this illustration, representing a form of division, do not coincide with any forms we have personally observed. (See Fig. 4.)

An investigator who undoubtedly observed these bodies was P. Foa.[3] (See Fig. 5.) In Figs. 2 and 16 of Plate II and 13 of Plate III, this author illustrates these bodies from carcinoma of the breast. He also recognizes the identity of many of the bodies described by him and those of Soudakewitsch, just mentioned.

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[1] Sjöbring.—Ein parasitäre Protozoartiger Organismus in Carcinomen. *Fortschritte d. Medecin,* 1890, p. 529.

[2] Thoma.—Ueber eigenartige parasitäre Organismen in den Epithelzellen der Carcinome. *Fortschritte der Medecin,* 1889, p. 413.

[3] Foa.—Ueber den Krebsparasiten. *Cent. f. Bakteriologie,* Vol. XII, p. 185, 1892.

Kürsteiner[1] describes two cases of carcinoma, one villous carcinoma of the bladder, and the other papillary adenocarcinoma of the uterine mucosa, in which he found embedded in the cells spherical and oval bodies with well-defined central structures staining with eosin. His illustrations are all taken from a villous carcinoma of the bladder and leave no doubt that in Figs. 3, 4, 5, 6, 7 and 8, Plate XII, he was dealing with typical bird's-eye inclusions. (See Fig. 6.) Of interest are the large number of inclusions which Kürsteiner noted in certain cells of his preparations. In one cell he was able to count as many as *eighty inclusions.* He inclines to the belief that the inclusions may be parasites, but expresses himself with great caution.

Seegenbeck van Heukelom,[2] in an address before the 10th National Medical Congress in Berlin, 1890, describes the presence in carcinoma, including nearly every type, covering some 200 different cases, of large and small spherical inclusions in carcinoma cells. These sometimes presented a double contour, appeared to be filled with protoplasm and presented a nuclear-like structure, which stained with carmine. Besides these so-called larger spheres he describes smaller ones, which he says were found embedded in the protoplasm and in the nuclei. They did not stain with carmine, and but weakly with eosin. They were not very refractive. From his description of the larger bodies, it is certain that they corresponded with those of Wickham, and of the smaller it is difficult to say whether they represent the typical bird's-eye inclusions or not. The description is, unfortunately, unaccompanied by illustrations.

The description given by Podwyssozki and Sawtschenko[3] varies somewhat from the description of other authors, but some of the inclusions illustrated by them present the characteristics of the typical bird's-eye form. Fig. 2, Plate VII; Fig. 20, Plate VIII, inclusion to the left, are characteristic. (See Fig. 7.) The tech-

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[1] Kürsteiner.—Beiträge zur pathol. Anatomie der Papillome und papillomatösen Krebse von Harnblase und Uterus. *Virchow's Archiv,* Vol. CXXX, p. 463.

[2] Seegenbeck van Heukelom.—*Centralblatt f. allg. Pathologie und pathologische Anatomie,* Vol. I, p. 204.

[3] Podwyssozki and Sawtschenko.—*Centralblatt f. Bakteriologie,* Vol. XI, No. 16, 1892, p. 493.

PLATE XVIII.

FIG. 1.

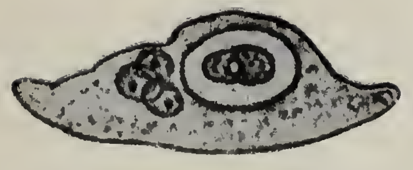
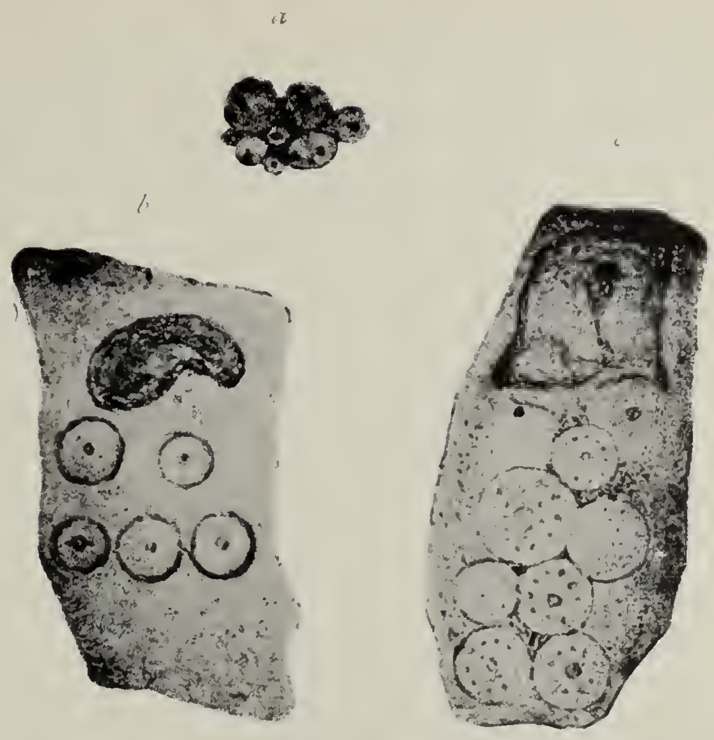


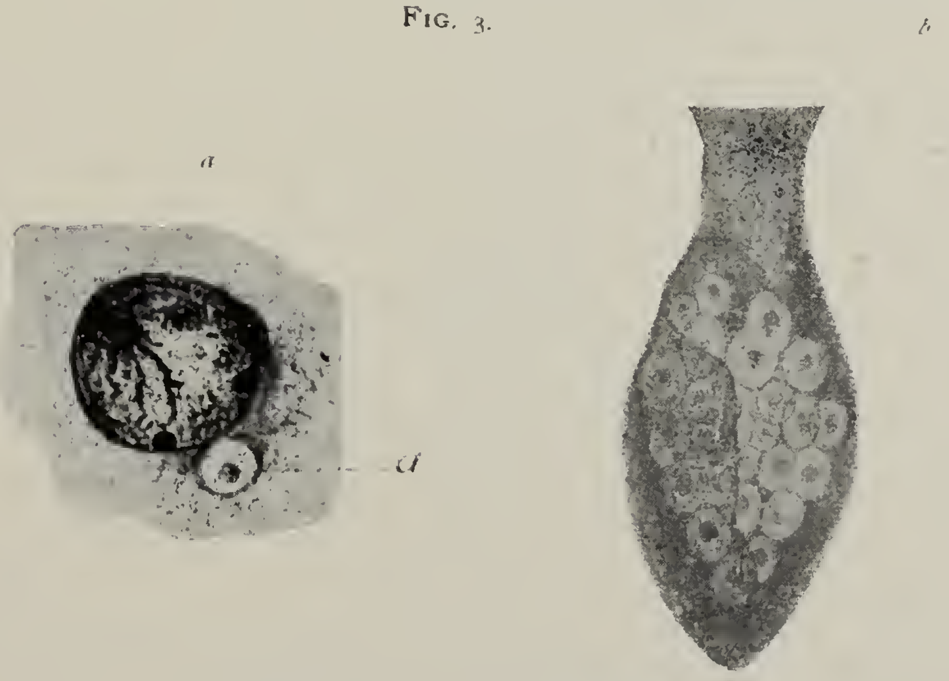
Plate II, Fig. 4d, after Virchow.

FIG. 2.



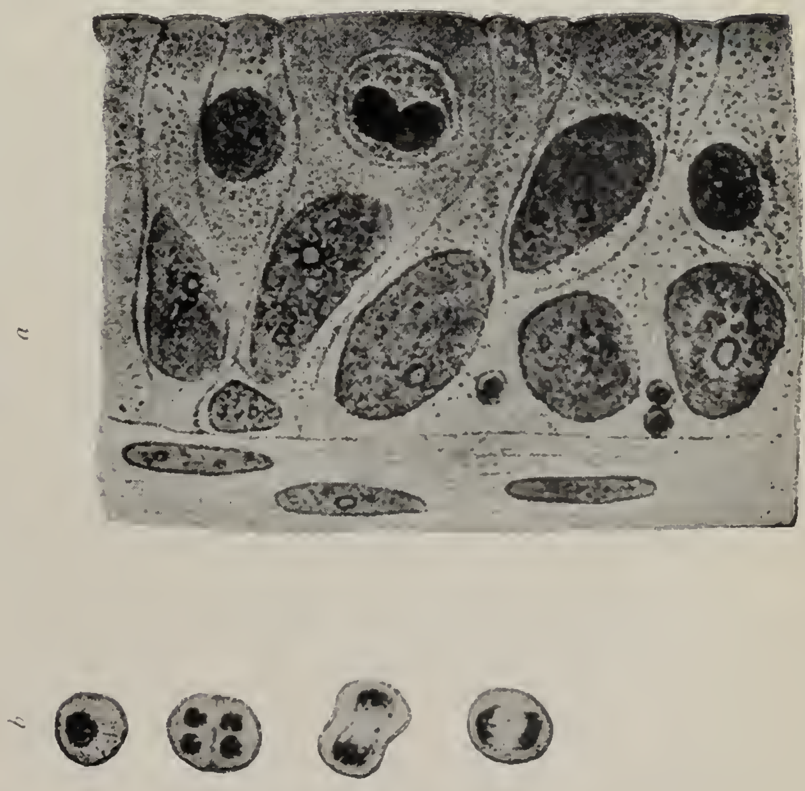
a Plate XII, Fig. 17, after Soudakewitsch.
b Plate VI, Fig. 2, after Soudakewitsch.
c Plate XII, Fig. 7, after Soudakewitsch.

FIG. 3.



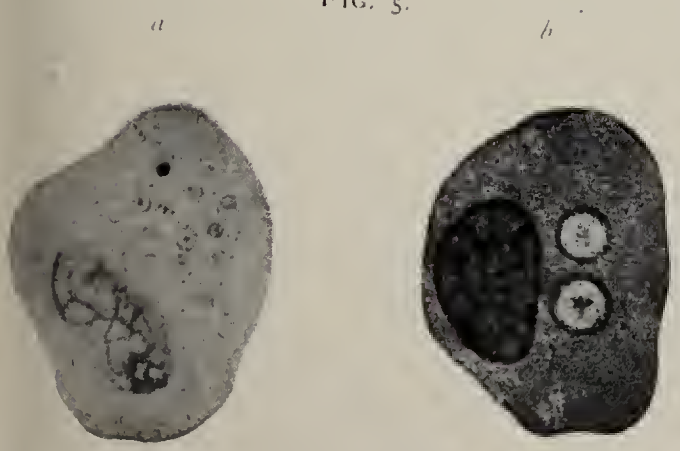
a Plate IV, Fig. 1, after Sjöbring.
b Plate IV, Fig. 14, after Sjöbring.

FIG. 4.



a Adenocarcinoma of the rectum—Thoma.
b Parasitic forms from above

FIG. 5.



a Plate II, Fig. 2, after Foa.
b Plate II, Fig. 16, after Foa.

nique employed by these authors was somewhat different from that of others, although based on osmic acid fixation, the stain being safranin and picric acid.

After a most careful review of the forms of inclusions previously described in carcinoma, Borrel[1] concludes that the only bodies which under any circumstances could be considered as parasitic are the typical bird's-eye inclusions. In Figs. 8 and 9, Plate II, Borrel illustrates two large epithelial cells from epithelioma of the maxillary region, containing typical bird's-eye inclusions. (See Fig. 8.) Fig. 9 of this plate likewise shows forms suggestive of nuclear division, to be considered later.

Sawtschenko[2] describes as appearing in several tumors, the origin and number not being given, cell inclusions of the bird's-eye type. Those shown in Figs. 7, 8, 9, 10 and 11 are entirely characteristic. (See Fig. 9.) His preparations were from material hardened in Flemming's solution, stained with safranin.

Ruffer and Walker[3] illustrate these inclusions in Plate XIV, Figs. 4 and 8, from two cases of gastric carcinoma; Plate XVI, Fig. 10, from carcinoma of the breast; Figs. 20, 21, 25, 28, 29, hardened with Flemming and stained with methyl-green, Biondi, also from cancer of the breast.

Ruffer and Plimmer[4] in Figs. 2, 5, 6, 12, 18, 32, 35, 37 and 49 of Plates I, II and III, give excellent illustrations of typical inclusions. (See Fig. 10.)

J. Jackson Clarke[5] illustrates on Plate III, Fig. 6, a group of typical bird's-eye inclusions, and at 7 and 10, masses of what appear to be spore-like bodies of a similar nature. (See Fig. 11.) He considers these inclusions to be sporozoa.

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[1] Borrel.—Evolution cellulaire et parasitisme dans l'epithelioma. *Montpellier,* 1892. *Thèse.*

[2] Sawtschenko.—Ueber schmarotzende Sporozoen in Krebsgeschwülste. *Centralblatt f. Bakteriologie,* Vol. XII, 1892, p. 17.

[3] Ruffer and Walker.—On some parasitic protozoa found in cancerous tumors. *Journal of Pathology and Bacteriology,* 1893, p. 198.

[4] Ruffer and Plimmer.—Further researches on the parasitic protozoa found in cancerous tumors. *Journal of Pathology and Bacteriology,* 1894, p. 3.

[5] J. Jackson Clarke.—Observations on the Histology of cancer. *Centralblatt f. Bakteriologie,* Vol. XVI, 1894, p. 281.

C. H. Cattle[1] describes typical bird's-eye inclusions, and especially calls attention to the fact that the inclusions can be found in the acini of the mammary gland at the margin of cancer of the breast, at the points where the epithelium of the acini is undergoing cancerous transformation. This is probably the first definite reference to the presence of bird's-eye inclusions in the epithelium of the acini, where the epithelium still maintains its typical acinous arrangement. (See Fig. 12.)

Sawtschenko[2] again describes, under a number of cell inclusions of varying forms, certain that represent typical bird's-eye inclusions. Fig. 30, Plate VI (see Fig. 13), carcinoma of the breast, and 32 from the same; Plate V, Fig. 24, the lower figure, from carcinoma ventriculi, and 25, upper figure, carcinoma of the breast, are clearly defined bird's-eye inclusions.

Pianese[3] shows in Fig. 2, Plate IV (see Fig. 14), in one of the cells to the left, well-defined bird's-eye inclusions from carcinoma of the breast.

F. J. Bosc[4] shows in Plate I, Figs. 1, 2, 3, 4, 5, 6, 7, 10, 11 and 38*b*, well-defined bird's-eye inclusions. On Plate II, Fig. 1 (see Fig. 15), are many inclusions of this type. Fig. 2*m*, Fig. 3*x*, Fig. 4*m*, Fig. 1*a*, Fig. 2*m*, Fig. 5*m*, 14, 15, 17 and 18 are from a case of carcinoma of the pancreas and liver; Plate IV, Figs. 26 and 28, epithelioma of the lower lip. On Plate II, Fig. 4 at "mor"; Plate III, Figs. 14, 15, 16, 18 and 19; Plate IV, Fig. 28; Plate V, Fig. 8 at "mor"; Fig. 12 at "mor"; Plate VII, Fig. 2*b* and Plate X, Fig. 4, the author pictures closely arranged groups of these bodies, which he considers to represent spore formation.

H. G. Plimmer[5] in his most recent article describes having found these bodies in a large number of cancers, and gives illustrations

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[1] Cattle, C. H.—Observations on the Histology of Carcinomata and the Parasite-like Bodies found in them. *Journal of Pathology and Bacteriology*, Vol. II, p. 367, 1894.

[2] Sawtschenko.—Sporozoen in Geschwülste. *Bibliotheka Medica*, D^{II}, Part 4, 1895.

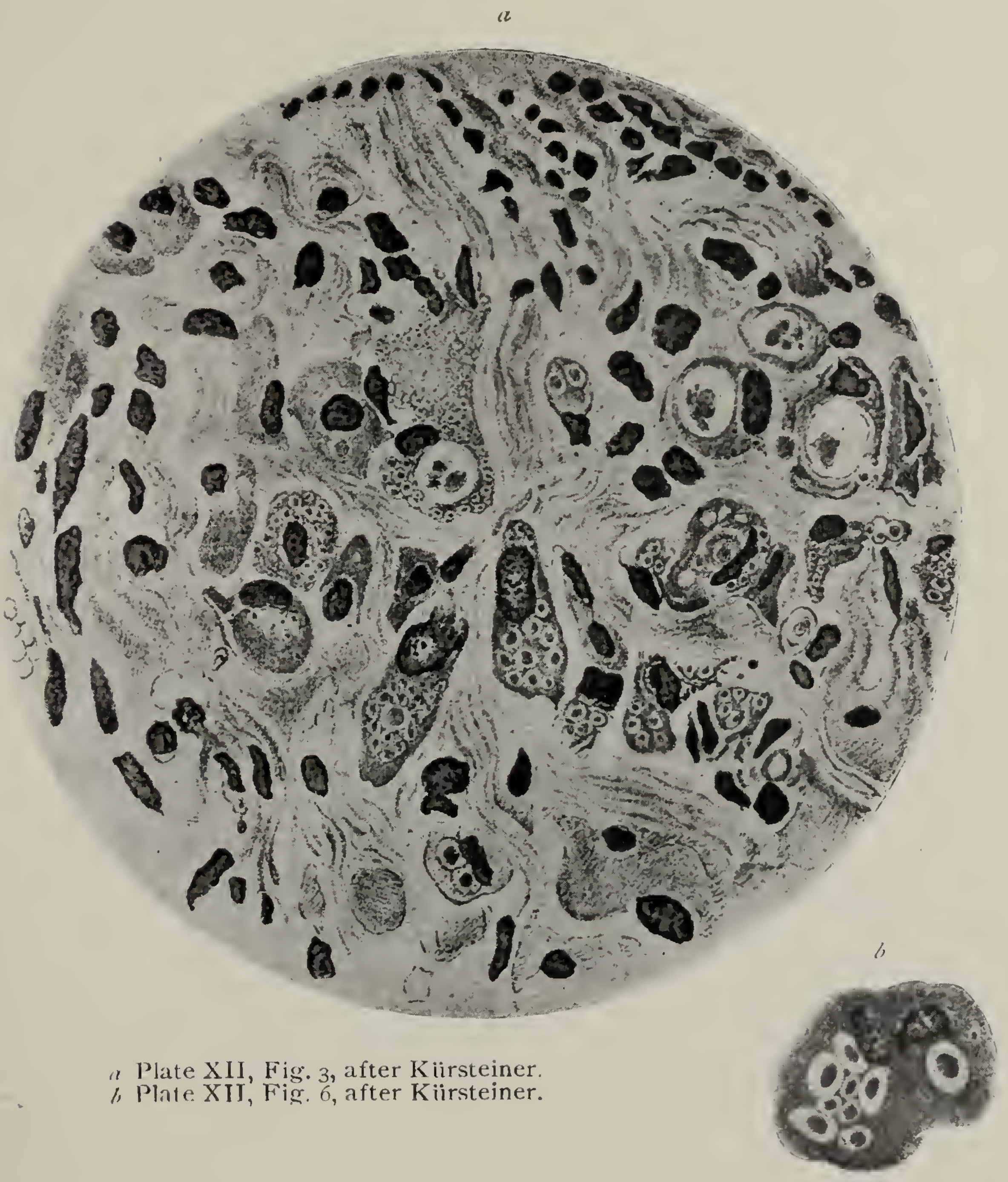
[3] Pianese. Beitrag zur Histologie und Aetiologie des Carcinoms. *Zeigler's Beiträge*, 1896, Suppl. 1.

[4] Bosc, F. J.—*A Monograph on Cancer*, Paris, 1898.

[5] Plimmer, H. G.—On the Histology and Etiology of Cancer. The *Practitioner*, April, 1899.

PLATE XIX.

FIG. 6.



a Plate XII, Fig. 3, after Kürsteiner.
b Plate XII, Fig. 6, after Kürsteiner.

FIG. 7.

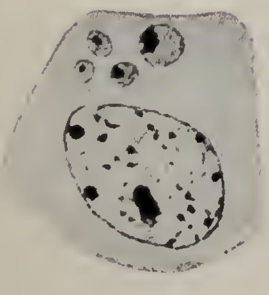


Plate VII, Fig. 2, after Podwyssozki and Sawtschenko.

FIG. 8.

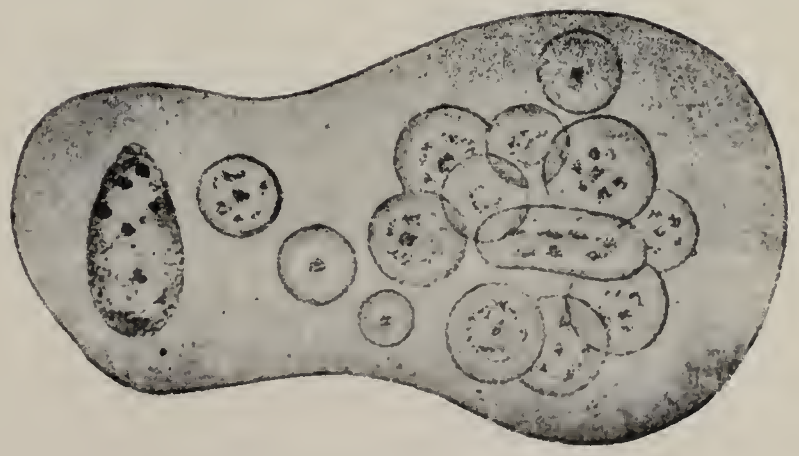
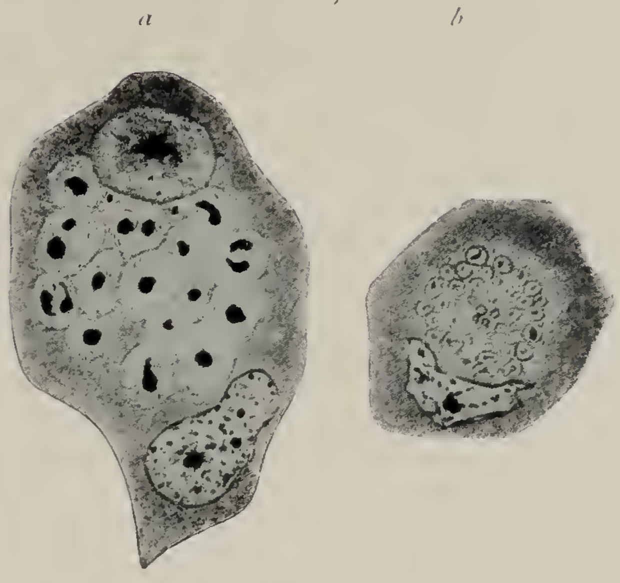


Plate II, Fig. 9, after Borrel.

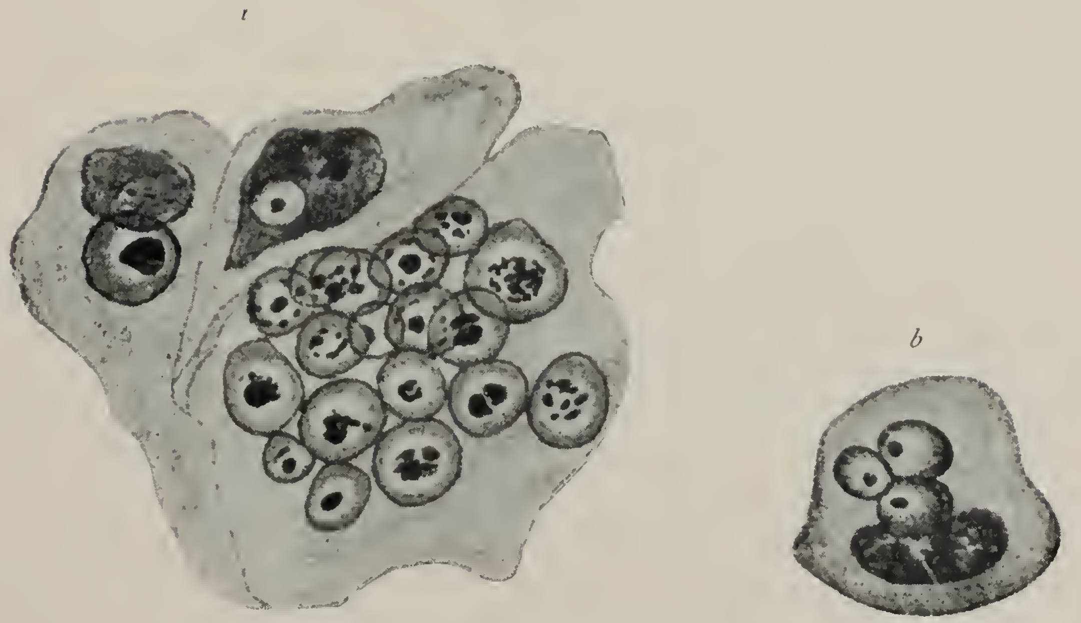
PLATE XX.

FIG. 9.



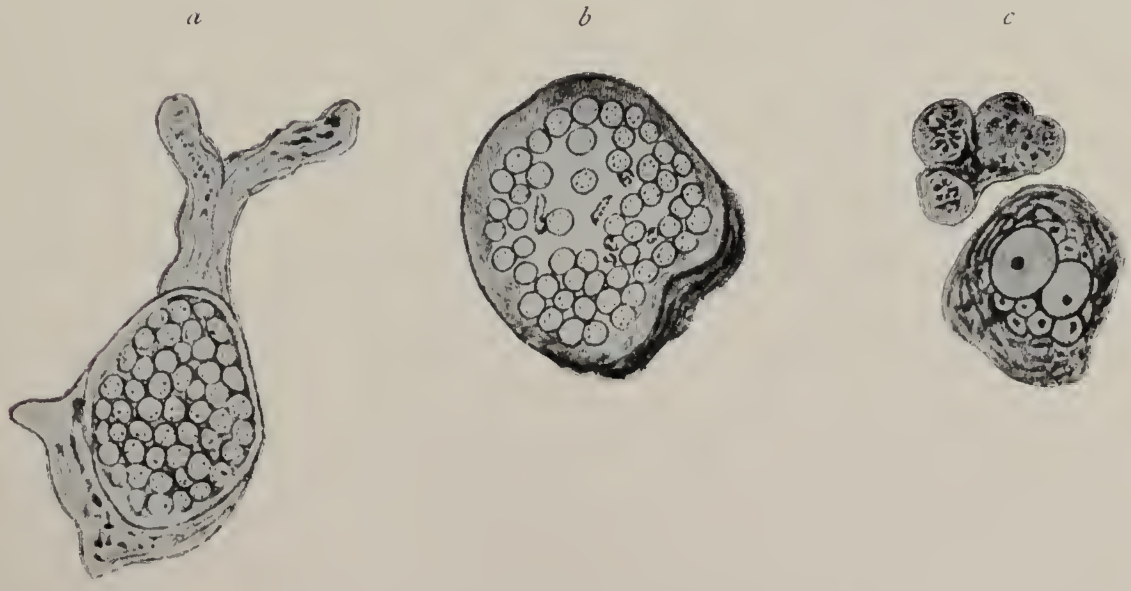
a Plate I, Fig. 10, after Sawtschenko.
b Plate I, Fig. 9, after Sawtschenko.

FIG. 10.



a Plate I, Fig. 5, after Ruffer and Plimmer.
b Plate XXIII, Fig. 11, after Ruffer and Plimmer.

FIG. 11



a Plate III, Fig. 10, after J. Jackson Clarke.
b Plate III, Fig. 7, after J. Jackson Clarke.
c Plate III, Fig. 6, after J. Jackson Clarke.

from a cancer of the breast which contained unusual numbers. The figures on Plate I (see Fig. 16), Figs. 7, 8, 9, 10 of Plate II illustrate these inclusions.

Sjöbring[1] in his most recent publication, illustrates typical cell inclusions of especial interest. These are illustrated as appearing (see Fig. 17) in the epithelial cells of the epididymis of a rabbit, from the immediate neighborhood of a fragment of carcinoma which had been transplanted under sterile conditions into the tunica vaginalis of the animal.

E. von Leyden,[2] in Plate I, illustrates inclusions from a carcinomatous lymph node from carcinoma of mamma and a carcinoma of the cecum. He suggested the term "bird's-eye inclusion" which aptly describes the appearance of these structures.

Gaylord[3] illustrates these bodies in Plates VIII, IX, XIV and Figs. 2 and 3, Plate XV; Figs. 1, 2, 3, and 4, Plate XVI, all taken from carcinoma of the breast.

Feinberg[4] describes characteristic bird's-eye inclusions embedded in the protoplasm of cancer cells, as well as a form which he believes to be extra-cellular, which appears to be without a central body. His article is unaccompanied by illustrations but from examination of his specimens there is no doubt Feinberg in part deals with the typical inclusions.

Greenough[5] illustrates on Plate XXXIII, Figs. 2 and 3, what appear to be typical bird's-eye inclusions. Plate XXXV, Fig. 3, appears to contain a typical inclusion. Those shown on Plate XXXIII were from a cyst adenoma of the breast. Fig. 3, Plate XXXV, is from carcinoma of the breast.

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[1] Sjöbring, N.—Ueber die Microörganismen in den Geschwülsten. *Centralblatt f. Bakteriologie*, Vol. XXVII, 1900.

[2] Von Leyden, E.—Zur Ætiologie des Carcinoms. *Zeitschrift für klin. Medecin*, Berlin, 1901.

[3] Gaylord, H. R.—The Protozoön of Cancer. *American Journal of the Medical Sciences*, May, 1901.

[4] Feinberg.—Zur Lehre des Gewebes und der Ursache der Krebsgeschwülste. *Deutsche med. Wochenschrift*, XXVIII, 11, p. 185, 1902.

[5] Greenough.—Cell Inclusions in Cancer. *Journal of Medical Research*, Vol. VII, No. 2.

Nösske[1] illustrates on Figs. 1, 2, 3 4*c* and 10, typical bird's-eye inclusions.

E. von Leyden[2] illustrates on Plate I (see Fig. 18) cells containing these inclusions from a case of pulmonary carcinoma and cancer of the breast. In Fig. 4*a* and *d* he shows a cell containing large masses of these inclusions, which he thinks are the termination of a process of spore formation. Figs. 3*a* and 3*b* show the same accumulation of closely packed smaller bodies in another cell. Several of his illustrations represent the bodies in the fresh state stained and unstained.

Posner[3] has recently published five drawings made by himself in 1876 while a student of Wagner's. (See Fig. 19.) These represent characteristic bird's-eye inclusions from carcinoma of the breast and one illustration of characteristic bird's-eye inclusions in a sarcoma cell from sarcoma of the spinal cord. This is the first recorded observation of bird's-eye inclusions in sarcoma.

Klimenko,[4] in an article reviewing a previous article of Feinberg, describes bird's-eye inclusions which he thinks, however, are not identical with those described by Feinberg. He was unable to find an inclusion corresponding exactly to those given by Feinberg. He has attempted to determine by microchemic reactions whether the bird's-eye inclusions are the result of degenerative processes, and concludes that they give no micro-chemical results indicating that they are. He agrees with Nösske that the inclusions are probably the result of secretive and excretive activity, or perhaps even evidence of reserve food stuff (glycogen) in the cells. He observed the fact that in certain cases of carcinoma of the breast, where there was great metotic activity in the cells, but few inclusions were present. On the other hand, in certain carcinomata, in which proliferation was not markedly active, a large number of inclusions could be found. He was unable to determine a direct relation between the presence of

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[1] Nösske.—Untersuchungen über die als Parasiten gedeuteten Zelleinschlüsse im Carcinom. *Deutsche Zeitschrift für Chirurgie*, Bd. LXIV.

[2] Von Leyden, E.—*Ueber die Parasiten des Krebses*, 1902.

[3] Posner.—Notiz über vogelaugenänliche Einschlüsse in Geschwülstzellen. *Archiv. für klin. Chirurgie*, Bd. LXVIII, Heft 3.

[4] Klimenko.—Eine Nachprüfung der Arbeit Dr. Feinberg's über seine Krebsparasiten. Beitrag zur Frage über die Einschlüsse in und zwischen den Krebszellen. *Centralblatt für Pathologie*, Vol. XIII, No. 21, p. 837.

PLATE XXI.

FIG. 12.

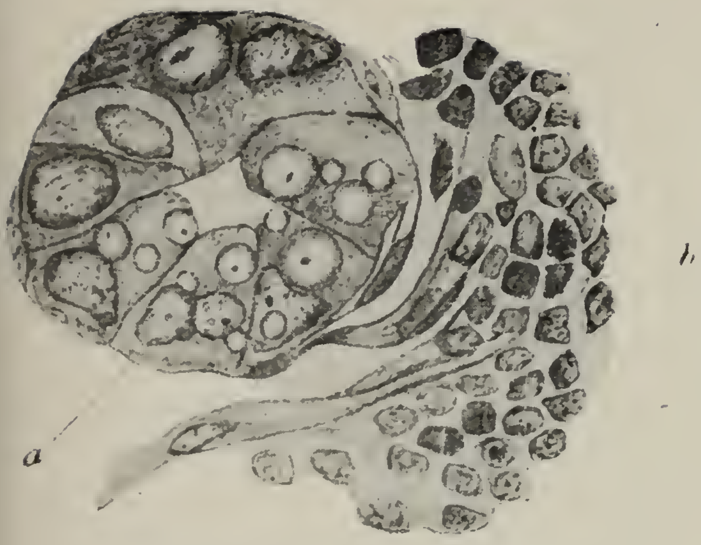


Plate XXII Fig. 9, after Cattle.

FIG. 13.

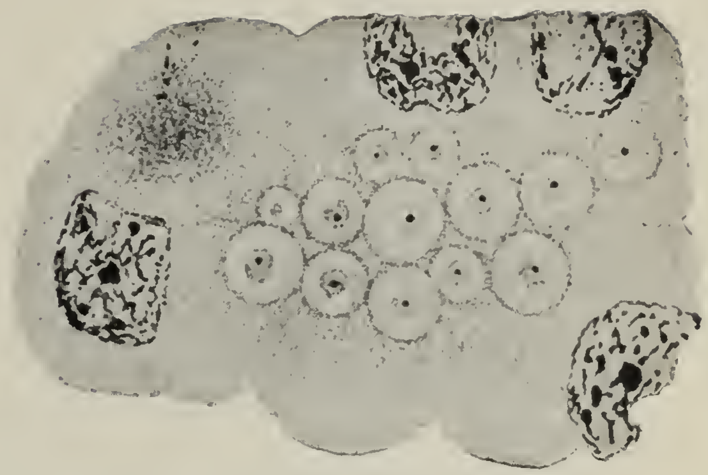


Plate VI, Fig. 30, after Sawtschenko.

FIG. 14.

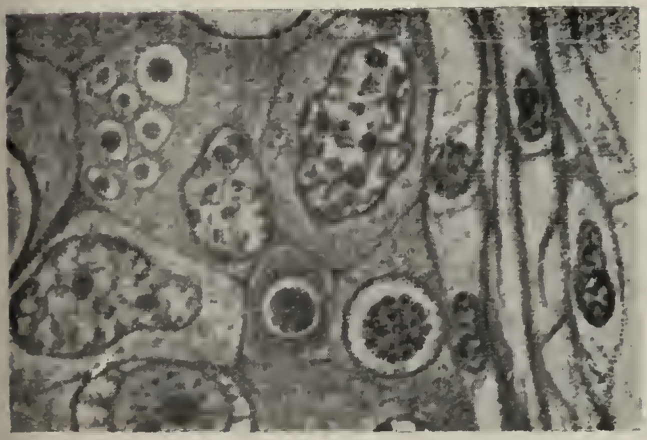


Plate IV Fig 2, after Pianese.

FIG. 15.

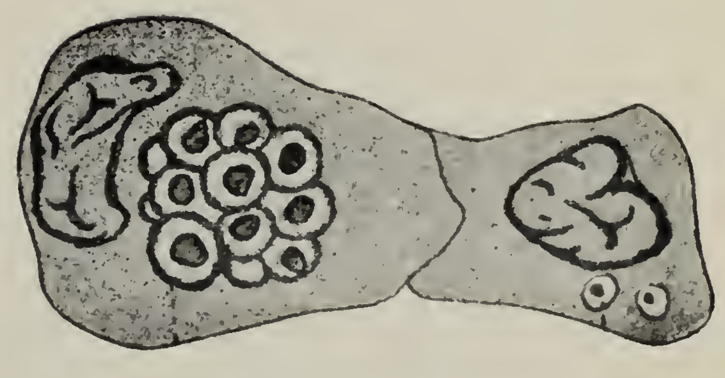
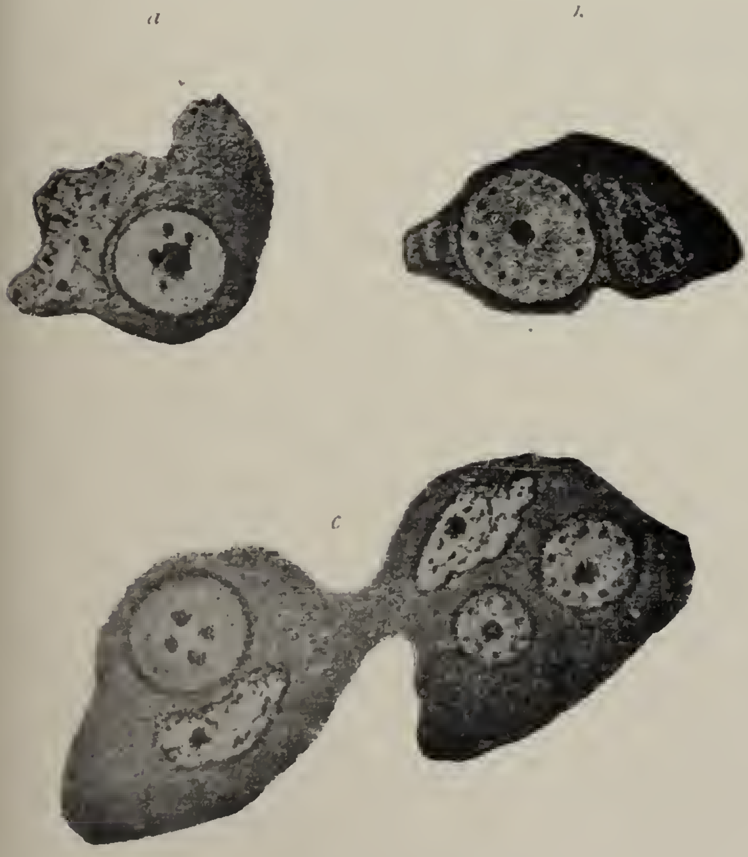


Plate II, Fig. 4, after Bosc.

FIG. 16.



a Plate I, Fig. 5, after Plimmer.
b Plate I, Fig. 6, after Plimmer.
c Plate II, Fig. 9-10, after Plimmer.

FIG. 17.

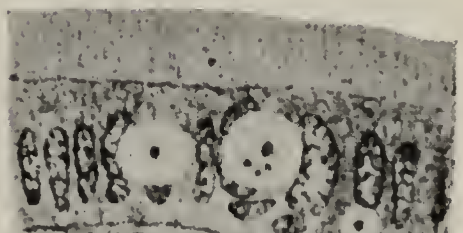


Fig. 1, after Sjöbring.

inclusions and metotic activity in the neighboring cells. He was never able to detect inclusions in cells undergoing division.

The theories advanced as to the significance of these bodies: (*a*) as degenerations of various kinds of the cytoplasm and nuclei of the cells. Of the authors already cited those who have undoubtedly observed and illustrated the inclusions which we are considering, Virchow, Pianese, Greenough and Nösske, interpreted them as the result of transformation or degenerations of the component part of the cells. Virchow in his first article interpreted these bodies as metamorphosed nuclei. In his second article he advanced the theory of endogenous cell formation and believed that the inclusions illustrated were cells thus formed. Borrel[1], who previously held that these bodies were of a parasitic nature, has recently suggested that they are produced by alterations in the centrosomes of the cancer cells. Pianese's article deals with a great variety of inclusions and only those quoted, Fig. 2, Plate IV, can be accepted as sufficiently characteristic to be included under the type we are considering. Pianese's investigations led him to the conclusion that all the structures illustrated were the result of different forms of metamorphosis, vacuolisation of the protoplasm, and hyaline and colloid degeneration. It would appear from the recent publication of Pianese that he has somewhat modified his interpretation of at least certain varieties of the inclusions described in his extensive monograph. In his most recent[2] article, which deals with a protozoon infecting the renal epithelium of the guinea-pig, Pianese concludes that the presence of this organism leads to the development of active mitotic changes of the adjacent epithelial cells. These figures are either typical or atypical, and the latter closely resemble the forms of mitosis found in carcinoma. He likewise finds that the epithelium presents other characteristics (karyolysis, karyorrhexis, nucleorrhexis and nucleolysis) uniformly observed in cancer cells. Lastly, he finds that many of the epithelial cells contain inclusions closely resembling certain varieties found in carcinoma. He was unable to satisfy himself as to whether these inclusions were stages in the development of the parasite or changes produced in the cell by the indirect action of the organism. It would appear from this article that Pianese does not at present hold fast to the conclusion, that all the cell inclusions in cancer are the result of degeneration of the cells.

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[1] Borrel.—Les Theories parasitaires du cancer. *Ann. de l'Institut Pasteur,* Vol. XV, 1901.

[2] Pianese.—Ueber ein Protozoon des Meerschweinchens. *Zeitschr. f. Hygiene und Infectionskrankheiten,* Vol. XXXVI, Part 3.

Greenough concludes these bodies are the result of secretory activity of the cell. He bases his conclusions on the facts that the inclusions are not found in epithelioma or sarcoma, and that they are found in non-cancerous diseases of the mammary gland, *i. e.*, fibroadenoma. Nösske arrives at a conclusion similar to that of Greenough, believing the inclusions to be the result of secretory activity on the part of the cells. Borrel[1] interprets many of the cell inclusions as centrosomes.

Besides these authors a number of critical articles have appeared. Lubarsch[2] believes that the inclusions may be one of the four following: First, they may be the result of vacuolisation of the cell protoplasm in which protoplasmic remains become condensed and form a central body. Second, they may be centrosomes (Borrel), numbers of which have been found in giant cells by Heidenhain and Benda. Third, the bodies are the result of the phagocytic activity of the cancer cells which take up red blood corpuscles, these disintegrate, the remains forming the central body. Fourth, the bodies are caused by secretion granula around which a halo of pale protoplasm is formed. To these four may be added two more. Fifth, the belief that they are the result of special secretory activity on the part of the cells (Greenough, Nösske); and, sixth, Hansemann[3] believes that these bodies are formed as a result of the fixative which extracts the water from hyaline material embedded in the protoplasm. As a result of this extraction of water the hyaline material remains as a condensed central mass which forms the central body.

It will be seen from the above enumeration, that investigators who have interpreted these so characteristic inclusions as the result of metamorphosis of the cytoplasm, are in no way agreed as to the manner in which they are formed. Those who hold that the bodies are probably parasitic in their nature, have advanced certain arguments in objection to the above interpretation.

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[1] Loc. cit.

[2] Lubarsch.—*Pathologische Anatomie und Krebsforschung*, 1902.

[3] Hansemann.—Die mikroskopische Diagnose der bösartigen Geschwülste. Second Ed., 1902, Berlin.

First of all, all investigators who have interpreted the bodies as parasites have failed to find characteristic inclusions in any other structures than tumors. It is claimed that in properly fixed sections the bodies present a characteristic appearance, and can be distinguished from simple vacuolisation of protoplasm. The most recent utterance on this subject is that of Benda.[1] He states that although he has searched carefully for these inclusions in all kinds of tissue he has failed to find them in anything but malignant growth. It must appear, then, that if the bodies are the result of vacuolisation of protoplasm, this form of degeneration is characteristic of carcinoma cells. An apparent exception to this statement is that contained in the publication of Nösske. This author claims to have found typical bird's-eye inclusions in the epithelium of the normal acini of the breast. An analysis of this statement shows first, that the normal breast referred to was located at the margin of a nodule of carcinoma. Through the courtesy of Prof. Marchand, the writer has had the privilege of seeing this section. After carefully viewing the preparation it appeared to us that the epithelium in question had already begun to proliferate. In one portion of the acinus there were three distinct layers of the epithelium. We were of the opinion in this case that the epithelium had already undergone cancerous metamorphosis. Dr. Nösske exhibited this preparation at the 31st Surgical Congress in Berlin, April 3, 1902. It was viewed by a number of pathologists, a majority of whom were likewise of the opinion that the epithelium had already undergone carcinomatous transformation. The presence of the inclusions, therefore, at the margin of carcinoma nodules would rather more strongly indicate that they were of parasitic nature than that they were degenerations. The observation is not new, the distribution of the inclusions in the acini at the margin of carcinoma of the breast having been referred to and accurately described by Cattle.

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[1] Benda.—Sitzung der Karzinom Comite, Oct. 4, 1902.

The bodies illustrated by Greenough found in fibroadenoma of the breast are undoubtedly characteristic bird's-eye inclusions, but inasmuch as fibroadenomata are known in many cases to become transformed into cancer, and as the etiology of this form of tissue development is unknown, their appearance in this class of tumor in no way excludes the possibility of their being parasites. The inclusions shown by Nösske, as appearing in the bronchial epithelium in a case of congenital syphilitic pneumonia in a new-born child, are so essentially different from the bird's-eye inclusions as to be excluded, even from the illustrations which accompany his article.

As to the second possibility that the bodies are centrosomes, as noted by Benda and Heidenhain (Borrel and LeCount[1]), this supposition is rendered improbable by the great number occasionally found in a single cell. Kürsteiner counted as many as 80 in one cell, and Plimmer[2] illustrates a cell containing 27 inclusions. Fig. 23 illustrates a cell in which 18 cell inclusions can be counted.) Secondly, the fact that centrosomes can be found in cells containing these inclusions and can be definitely distinguished from them should dispose of this interpretation of the body.

In this connection, the evidence of Benda (*Verhandlungen der deutschen Gesellschaft für Chirurgie*, 31st Surgical Congress, Berlin, April 3, 1903, p. 73,) is of great importance. One of the first to describe centrosomes, and quoted by Lubarsch as an authority, he states first that centrosomes have often been sought for in carcinoma cells without their presenting any pathological alterations. He states that he has recently, with new and specially proved methods, investigated this question, and holds that the *theory of Borrel is incorrect,* in that he has repeatedly found the centrosomes intact in cells which contained numbers of the bird's-eye inclusions. He holds that the hope of explaining the abnormal proliferation of carcinoma cells as the result of alterations of the centrosome is fruitless.

Third, the interpretation of these bodies as disingtegrating red blood cells taken up by the epithelium (Lubarsch) has been advanced by various observers. This criticism has likewise been applied to preparations of our own in which we had injected Plasmodiophora spores into the tissue of warm-blooded animals, in repeating the experiments of Podwyssozki[1] where Plasmodiophora spores were taken up by the phagocytic connective tissue cells of the animal and presented an appearance, in may cases, indistinguishable from the bird's-eye inclusions in carcinoma. In attempting to definitely exclude the red blood cells as a factor in the production of these forms, which we held to be metamorphosed spores, we examined a number of specimens taken from nodules developing on the peritoneal surface of frogs which had been inoculated in the same way. These nodules were composed of endothelial cells (as described by Podwyssozki) containing the spores of Plasmodiophora Brassicæ, many of which again presented an appearance identical with the cell inclusions in carcinoma, and identical with the spores embedded in the connective tissue phagocytes surrounding the fragments of implanted clubroot in warm-blooded animals. (See Fig. 23.)

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[1] *Journal of Med. Research.*

[2] Loc. cit.

The results of these two lines of experimentation were exactly the same, but the great difference in the red blood corpuscles of the warm-blooded and cold-blooded animals, in the first case non-nucleated, in the second case much larger and nucleated, left no doubt that the inclusions in both cases were the metamorphosed spores of Plasmodiophora Brassicæ. In neither series of experiments were we able to determine that the phagocytes had taken up red blood cells, although in other pathological conditions, *i. e.,* typhoid fever, it is a recognized fact that phagocytic cells commonly take up the erythrocytes. The difficulty of determining the origin of inclusions in cells without the aid of experimentation is emphasized in this case. Many of these bodies are larger than red blood corpuscles, and in properly prepared specimens we have never been able to find any ground for holding that they were altered erythrocytes. The fact that in many cases the central bodies of the bird's-eye inclusions can be stained with a nuclear stain, likewise speaks against this supposition.

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[1] Podwyssozki.—Myxomyceten, resp. Plasmodiophora Brassicæ Woron. als Erzeuger der Geschwülste bei Tieren. *Centralblatt für Bakteriologie,* Vol. XXVII, p. 97.

Fourth and fifth, that the bodies are not secretion granula or the result of special secretory activity on the part of the cell is more difficult to prove, but the fact that they have occasionally been found (Posner) in sarcomata render either explanation rather improbable. The statement of Nösske that they are only found in glandular epithelium and almost exclusively in the mammary gland, a view which Greenough holds, and to which we were previously inclined ourselves, is shown to be incorrect by a critical review of the literature of the earlier writers. This shows that undoubted birds's-eye inclusions have been found in carcinoma arising from other types of epithelium.

Sixth, that the characteristic appearance of these bodies is not due to any action of the hardening process (Hansemann) is shown by their *constant appearance in fresh material, where they have later been found in hardened and stained sections.*

As parasites.—With the exception of the authors above mentioned, the remainder of those who have accurately described or illustrated these inclusions have interpreted them as parasites. The earlier investigators compared them to recognized types of protozoa, notably the coccidia and the gregarinæ. Many of these authors describe, besides the forms which we are considering, larger and more complex structures presenting appearances not unlike certain forms in the development of these organisms. The younger form of coccidium perforans (Leuch) (coccidium oviforme), in the epithelium of the intestinal tract of rabbits is extremely like in appearance the bird's-eye inclusions of cancer.[1] The readiness with which ectogenous form of coccidia can be detected in the tissues of the animals infected, has, however, weakened the force of this comparison, because of the absence in the fresh material of cancer of forms presenting anything like the definite characteristics of the ectogenous cycle of the coccidia. A class of organisms which has attracted the attention of the more recent writers on the subject is the mycetozoa, especially one of the group, Plasmodiophora Brassicæ, an organism which causes tumors and outgrowths in plants. This class was previously placed among the lower types of fungi, but more recently has been accepted as a variety of protoza, Doflein, in his recent book on the subject classifying it under the rhizopoda.

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[1] See Fig. 221, Lang, Lehrbuch der vergleichende Anatomie der wirbellosen Thiere. Zweite Lieferung. Protozoa.

The first to call attention to a possible connection between cancer and kohlhernia was R. Behla. He noted the prevalence of this disease in plants in localities in which cancer was prevalent. He inoculated animals with fragments of the plant tumors and noted that granulation tumors resulted. He did not, however, detect the presence of the parasite in the tissue cells. Podwyssozki[1] after viewing the preparations of Nawaschin in a preliminary announcement, called attention to the fact that certain forms of this organism and certain inclusions in cancer presented great points of similarity. He afterward reported experiments upon rabbits, guinea-pigs, frogs and axolotls, in which he had succeeded in producing infection and had detected the presence of the spores in the cells of the infected animal. He found that the introduction of the spores of plasmodiophora in the tissues of both cold and warm-blooded animals, led to the development of tumors of considerable size made up of cells derived, either from the connective tissue, or from the endothelium of the surrounding lymph spaces. In the latter case the tumors presented the characteristics of an endothelioma. He was able to determine that the presence of the parasite led to the proliferation of the nuclei of the infected cells.

Following Podwyssozki, von Leyden[2] likewise noted the similarity between bird's-eye inclusions and the amœboid form of Plasmodiophora in the plant cell. Feinberg[3] emphasises the same similarity. Nösske does not think the similarity of the cell inclusions and the amœboid form of Plasmodiophora to be so great.

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[1] Loc. cit.

[2] von Leyden, E.—Zur Ætiologie des Carcinoms. *Zeitschr. f. klin. Medecin,* Vol. XLIII, Part ½. Ueber die Parasiten des Krebses. *II Ergänzungsband vom klinischen Jahrbuch.*

[3] Feinberg.—Ueber den Erreger der krankhaften Auswüchse des Kohls (Plasmodiophora Brassicæ Woronin). *Deutsche med. Wochenschr.,* March 3, 1902.

All these comparisons, except that of Behla are based upon the publication of S. Nawaschin.[1] Upon receipt of this article we were greatly surprised at the remarkable similarity between many of Nawaschin's figures and bird's-eye inclusions in cancer. According to Nawaschin, the organism first appears in the plant in the form of an amœba, after having entered as a swarmer. These amœbæ are found in the plant cells lying in the sap spaces and, except in very early infections, a number were found in each cell. The amœbæ contain in their protoplasm when observed in the fresh state, highly refractive granules of equal size, which present an appearance very much like fat. The nuclei are spherical or oval and consist of a vacuolous structure with a central body. It is this nucleus which so resembles the bird's-eye inclusions. The organism having become transformed into an amœba in the plant cell, *lives a strictly symbiotic existence with the infected cell.* It divides by a special form of cell division which we shall consider in detail, and only when the plant cell is exhausted is the cycle inaugurated, which leads to spore formation.

This latter cycle, that of spore formation, is entirely distinct from the process of nuclear division by which the amœbæ increase in number. In the younger forms of the organism (Fig. 20), the protoplasm surrounding the nucleus of the parasite is scarcely distinguishable from the protoplasm of the plant cell and extends into it in delicate prolongations. The change leading to nuclear division in the amœba, are first found in the appearance of fine grains of chromation within the nucleus, scattered indiscriminately in the clear space between the central body and the periphery. (Fig. 21*a*.) The nuclei in this stage are somewhat larger than immediately after division. These chromatin granules group themselves about the central body which first becomes indistinct (Fig. 21*b*), and then divides. They are more or less definitely arranged in the form of a circle in the plane of the division. (Fig. 21*c*.) A section through the nucleus in this stage shows the two central bodies closely approximated, with the smaller chromatin granules in the transverse axis.

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[1] Nawaschin, S.—Beobachtungen über den feineren Bau und Umwandlungen von Plasmodiophora Brassicæ Woron. im Laufe ihres intracellularen Lebens. *Flora*, 1899, Vol. LXXXVI, Part 5.

A section in the transverse axis shows the central body surrounded by a ring of chromatin granules, presenting the appearance of a rosette. (Fig. 21*d.*) The nucleus in this stage has already assumed an oval form and the central bodies then withdraw to the poles of the cell. (Fig. 21*e.*) In this stage they are sometimes connected by one or two threads of chromatin which later disappear. Division is then completed by the capsule folding in at the center, leaving two perfectly formed nuclei each with a central body, the two closely approximated. (Fig. 21*f.*) In this way a single amœba may possess a number of nuclei.

Aside from the characteristic nucleus, the protoplasm of the amœba is of interest, containing, as it does, in the fresh state, coarse granules of uniform size. These granules are blackened by osmic acid and on the extraction of the fat from the preparations they disappear, leaving a coarsely reticulated protoplasm. (Fig. 21*f.*) The central body of the nucleus, when stained with Flemming's triple stain, reacts variably to the stain. When in the amœboid form the central body of the nucleus stains brilliant red. In the first stage of spore formation, the central body stains a deep blue-black. This point is of importance inasmuch as certain discrepancies in the staining of the central bodies of the bird's-eye inclusions have been previously noted.

The process which leads to spore formation is entirely distinct from that by which the amœba, as such divides. In preparation for this process the nuclei of the amœba divides repeatedly by the method already described, thus each amœba contains a number of small nuclei. The margins of the amœba then become indistinct, the nuclei likewise become less distinct and the different amœbæ coalesce. The central body of the nucleus then becomes very indistinct, the protoplasm granular. The nuclei at this stage contain fine granules and are with difficulty distinguished from the surrounding protoplasm. The whole structure now forms a plasmodial mass. There now develops in each nucleus a well-defined spindle with medullary plate, all of the nuclei dividing at once. This process of division follows the recognized types of mitosis and when complete the entire mass breaks down into small amœbæ, each containing one nucleus. These are at first of irregular shape and stain poorly. The irregularly shaped myxamœbæ are gradually rounded and condensed until they ultimately form spherical bodies of similar size with well-defined margins, each containing a highly refractive central body. It is to be noted that *the complete spore again presents an appearance not unlike the nuclei of the amœbæ.*

Recognizing the great similarity between the bird's-eye inclusion in cancer cells and the nuclei of the amœba in Plasmodiophora in the plant cell, a similarity which to a lesser degree is shared by spores of Plasmodiophora, it occurred to us to search our preparations for evidence of some form of division in the inclusions, and likewise to determine if the protoplasm surrounding the inclusions could be distinguished from the remaining protoplasm of the epithelial cell. In searching our preparations we came upon one which has already served us for photography, the illustrations of which appear in our previous publication, being the low power illustrations on Plate VIII, Plate XIV, Fig. 1, Plate XVI.[1]

This preparation consisted of a thin section, approximately 2 mm. square, taken from the margin of a rapidly growing carcinoma of the breast. It contained a large number of inclusions, in many fields every cell containing one or more. The fixation of this preparation was unusually successful and the differentiation excellent. We had little difficulty in repeatedly finding forms extremely suggestive of the method of division, illustrated in Fig. 21—*a, c, d, e* and *f* from Nawaschin. Fig. 24 was repeatedly found and appears to represent a stage similar to that shown in Fig. 21*a* Nawaschin. We next repeatedly encountered inclusions in which the central body had divided and in nearly every case found two small granules of chromatic material in the transverse axis so arranged as to present an appearance exactly like Fig. 21*e* from Nawaschin. In Fig. 25 an inclusion presenting this appearance is shown. The two granules in the transverse axis are extremely small and were photographed with difficulty. It is this form which, when sectioned in the transverse axis, produces the rosette appearance which was likewise repeatedly encountered. In Fig. 26 the central body lies

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[1] *American Journal Med. Sciences.*

PLATE XXII.

FIG. 18.

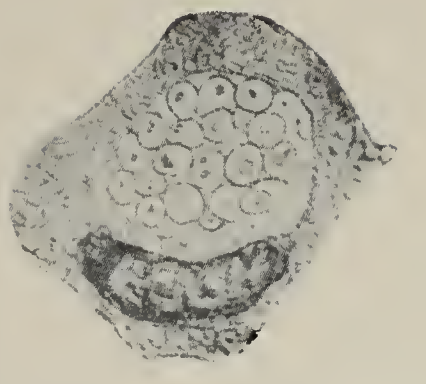
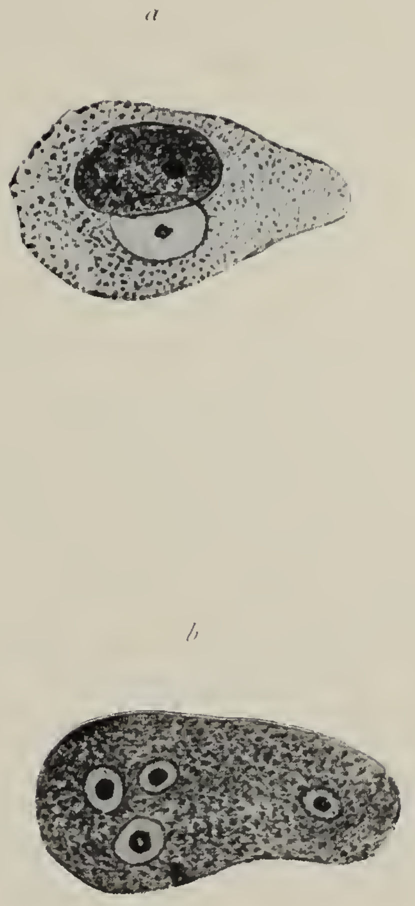


Plate I, Fig. 4*a*, after von Leyden

FIG. 19.



a Fig. 3, after Posner.
b Fig. 5, after Posner.

FIG. 20.

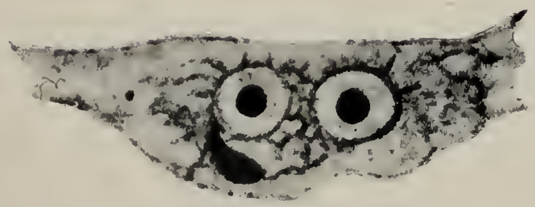
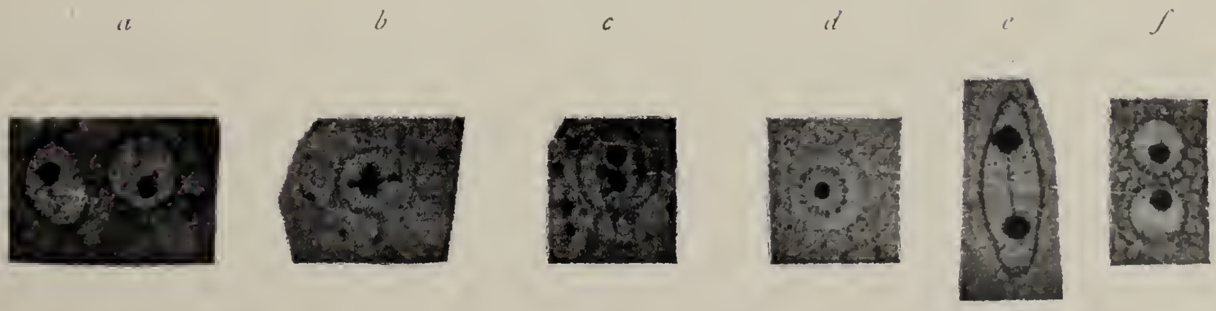


Plate XX, Fig. 6, after Nawaschin.

FIG. 21.



a Plate XX, Fig. 14, after Nawaschin.
b Plate XX, Fig. 17*f*, after Nawaschin.
c Plate XX, Fig. 17*c*, after Nawaschin.

d Plate XX, Fig. 17*d*, after Nawaschin.
e Plate XX, Fig. 18*d*, after Nawaschin.
f Plate XX, Fig. 15, after Nawaschin.

somewhat below the plane of focus and the rosette appearance is not so characteristic as occasionally seen. Many forms were found in which the rosette was apparently sectioned in an oblique plane so that but one half of the rosette appeared in the inclusion. Fig. 27 shows what appears to be the next stage in the process of division, the two central bodies having withdrawn to the poles of the cell, and separation of the two by the capsule is suggested by the appearance of the inclusion. Bodies which had apparently divided were repeatedly found, Fig. 28 representing this stage. In Fig. 29 are likewise seen bodies cut somewhat obliquely, also representing this stage. We had no difficulty in finding all of these forms repeatedly.

A careful examination of the protoplasm surrounding the inclusions was made to determine whether a differentiation of the possible protoplasm of the parasite and that of the epithelial cell could be made. In many cases a distinct reticulation of the protoplasm was visible as in that surrounding the two inclusions in Fig. 28. In one or two portions of the section we found what appeared to be inclusions surrounded by reticulated protoplasm which had become detached from the nuclei of the cells in which they were included. Fig. 29 shows an inclusion of this sort surrounded by reticulated protoplasm, which has become detached from the nucleus of the cell lying slightly to the left. In certain cells we found large numbers of small inclusions closely packed. In these we were unable to find any evidence of the changes above described. Fig. 23 shows a cell containing a number of bodies somewhat more distinct than those containing the apparent nuclear changes.

A number of observers have undoubtedly spoken of similar groups of inclusions, as representing spore formation. (Bosc, von Leyden, Jackson Clarke.) The similarity of inclusions of the type shown in Fig. 23 to those already described, led us to repeat the experiments of Podwyssozki, for the purpose of ascertaining what appearance the spores of Plasmodiophora Brassicæ presented when embedded in the connective tissue and phagocytic cells of animals. This series of experiments was undertaken with uniform results. The spores could be found in the large connective tissue phagocytes embedded in the protoplasm of the cells. They consisted for the greater part of spherical bodies of vacuole-like appearance with a central body. Hardened and stained with Plimmer's method, they stained, as does the protoplasm, and presented an appearance in size, form and other characteristics indistinguishable from the cell inclusions in cancer. Fig. 22 represents two large phagocytic cells from the margin of an implanted fragment of clubroot in a guinea-pig, removed after nineteen days. The cell to the left contains a form of inclusion most commonly seen. Between the two cells are two larger forms which are constantly encountered in the fresh scrapings. These are spherical bodies with delicately defined limiting membranes and with fine granular contents or in some cases filled with homogeneous material. The two bodies shown lying directly between phagocytes are undoubtedly of this nature. It is probable that they represent a stage in degeneration of the spores. They are of interest inasmuch as bird's-eye inclusions in cancer are commonly encountered, which contain finely granular material and have invariably been quoted in support of the degeneration theory. It is evident that these spores under certain conditions undergo degeneration, which would render their differentiation from other products of degeneration difficult. Nösske has recently advanced a line of reasoning of this nature to show that all the bird's-eye inclusions represent a form of secretory activity on the part of the cells. Those who have studied the bird's-eye inclusions have apparently failed to consider the possibility of the inclusions, if of parasitic origin, undergoing a process of degeneration.

It will be seen from the foregoing that in the spores of Plasmodiophora Brassicæ, we have a form of parasite which, embedded in the protoplasm of a cell, frequently presents an appearance indistinguishable from certain of the cell inclusions in cancer. It must, therefore, be conceded that the inclusions in cancer which so *closely resemble them are possibly of parasitic origin. Furthermore, the detection in the inclusions in a single slide, of a cycle of changes so closely representing the process of nuclear division in the amœboid form of Plasmodiophora, must be viewed as strongly indicating the parasitic nature of these inclusions.*

Some of the phases of what we view as a process of nuclear division in the bird's-eye inclusions are indicated in the illustrations accompanying the articles of Soudakewitsch, Borrel and Plimmer. Fig. 2, *b*, which is Fig. 2, Plate VI, from Soudakewitsch, shows a body to the left and above which corresponds with Fig. 3 of the text from Nawaschin. Fig. 2, *c*, which is Fig. 7, Plate XII, from Soudakewitsch, represents a group of bodies nearly all of which present typical rosette forms. Fig. 2, *a*, which is Fig. 17, Plate XII from Soudakewitsch shows a body to the left with two central bodies apparently in the act of dividing. Fig. 8, from Borrel, shows a large epithelial cell containing a number of inclusions, some with single central bodies, but a majority showing typical rosette forms. Fig. 16, *a*, from Plimmer (loc. cit.) shows an inclusion with central body surrounded by a number of grains of chromatin. Fig. 16, *b*, from Plimmer, shows a typical rosette form and Fig. 16, *c*, from Plimmer, shows three inclusions, two of typical rosette form and one with four bodies arranged in a manner not unlike Fig. 4, from Nawaschin. Under the head of Methods of Division, Plimmer (loc. cit.) states that the division into two is by far the most usual method of multiplication. This is effected, he believes, by a form of budding, or the nucleus becomes somewhat oval in shape and then divides into two parts. These soon become equal and separate, and then the capsule throws in septa from either side between the divided nucleus, which meet. They then separate from each other and become two separate individuals. The rosette form Plimmer interpreted as evidence of a form of division in which portions of the nucleus have become detached and arranged at the circumference of the organism. This he believes was followed by a process of segmentation with the formation of a number of parasites. With reference to the statement made by Plimmer that these bodies divide by a form of budding, we have never been able to detect any appearance confirming this observation. We are of the opinion that the rosette form corresponds closely to that described by Nawaschin and shown in Fig. 5 of the text.

CONCLUSIONS.—In summing up we would conclude that the spores of Plasmodiophora Brassicæ in the phagocytic cells of both warm and cold-blooded animals, when fixed and stained with the methods employed in the investigation of bird's-eye inclusions in cancer, under certain conditions, present an appearance indistinguishable from these inclusions. Second, that a series of changes can be found in the bird's-eye inclusions in cancer closely resembling the process of nuclear division, as described by Nawaschin in the amœboid form of Plasmodiophora Brassicæ.[1]

DESCRIPTION OF PLATE XXIII

Fig. 22. Large phagocytic cells from guinea-pig, found at margin of implanted clubroot nineteen days after implantation. At *a* Plasmodiophora spore embedded in protoplasm of cell. Central body of spore eccentrically placed. No condensation of cell protoplasm surrounding spore. At *b* two larger forms of spores containing protoplasmic masses (possibly partly developed swarmers).

Figs. 23 to 29 are taken from one slide, carcinoma of the breast, hardened and stained with Plimmer's method. Magnification of all figures, 22 to 29 × 940.

Fig. 23. Epithelial cell from carcinoma of the breast, containing 14 round cell inclusions of like size and appearance. Same magnification as Fig. 22. (Compare with *a*.)

Fig. 24. Cancer cells, containing large inclusions with well developed central bodies. Scattered between central body and periphery of inclusions numbers of chromatin granules. (Compare with first stage of division of intracellular amœba of Plasmodiophora as shown by Nawaschin.)

Fig. 25. Elongated cell inclusion with two central bodies closely approximated. In the transverse axis two smaller grains of chromatin. (Compare with Fig. 2 from Nawaschin.)

Fig. 26. Cross section of inclusion similar to that shown in Fig. 25. The central body lies just below the focal plane, the grains of chromatin arranged in the form of a rosette about it. (Compare with Fig. 3 from Nawaschin.)

Fig. 27. Oval inclusion with two central bodies widely separated at poles. Suggestion of division with two bodies barely visible. (Compare Fig. 4, Nawaschin.)

Fig. 28. Two inclusions immediately after division. Central bodies well defined. Inclusions surrounded by reticulated protoplasm.

Fig. 29. Group of cells containing inclusions. At *a* an inclusion surrounded by reticulated protoplasm has become detached from the cell in which it was embedded. The inclusion in the surrounding reticulated protoplasm presents an appearance extremely like the myxamœbæ of Plasmodiophora.

February 1, 1903.

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[1] On the point of sending this article to press, we have received a short epitome in the *Deutsche Medizinal-Zeitung*, Beilag für Karzinomlitteratur, of an article by S. Prowazek, entitled "Zur Kernteilung der Plasmodiophora Brassicæ Woronin." It is impossible to judge from the epitome to exactly what conclusions the author has arrived, but it would appear that he has questioned the significance of the changes described by Nawaschin.

PLATE XXIII.

FIG. 22.

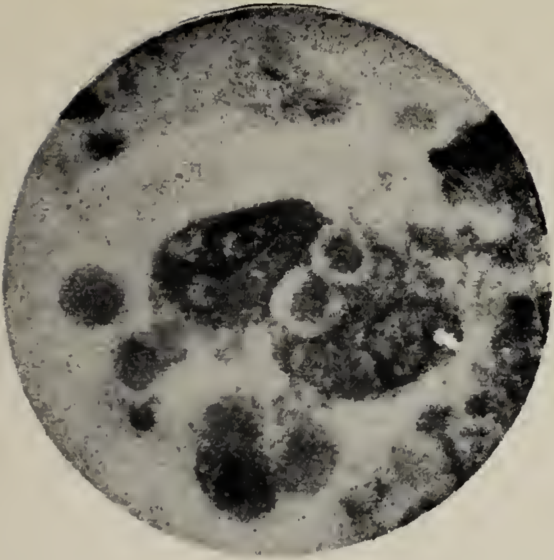


FIG. 23.

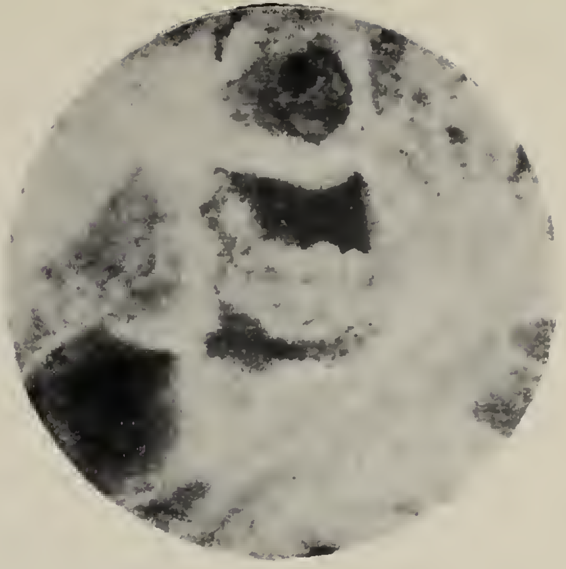


FIG. 24.

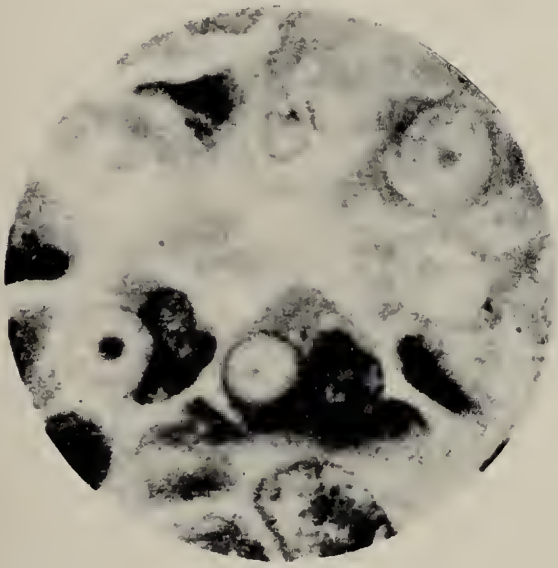


FIG. 25.

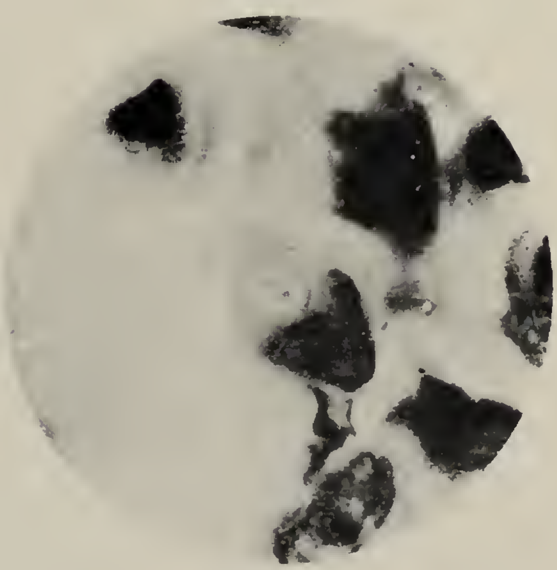


FIG. 26.

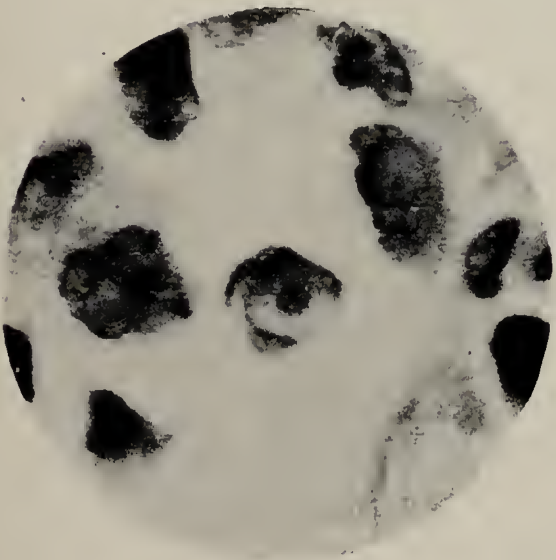


FIG. 27.

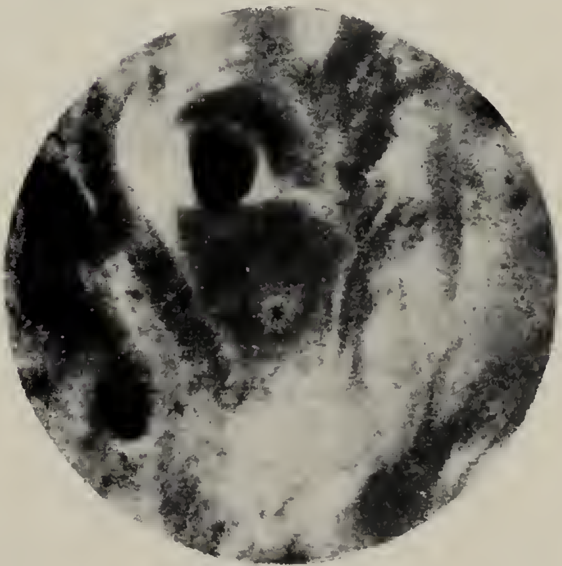


FIG. 28.

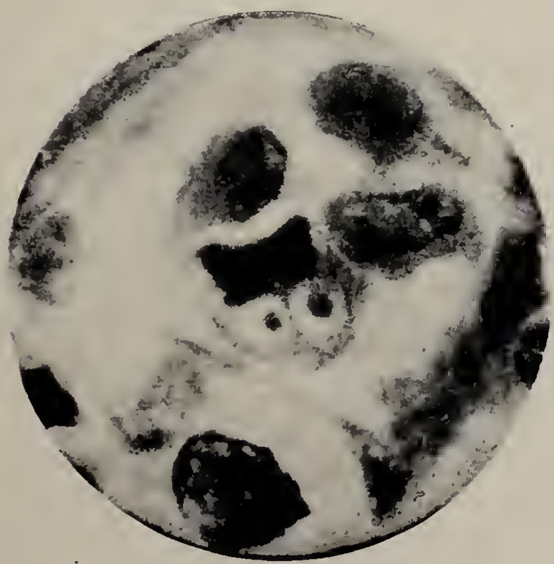
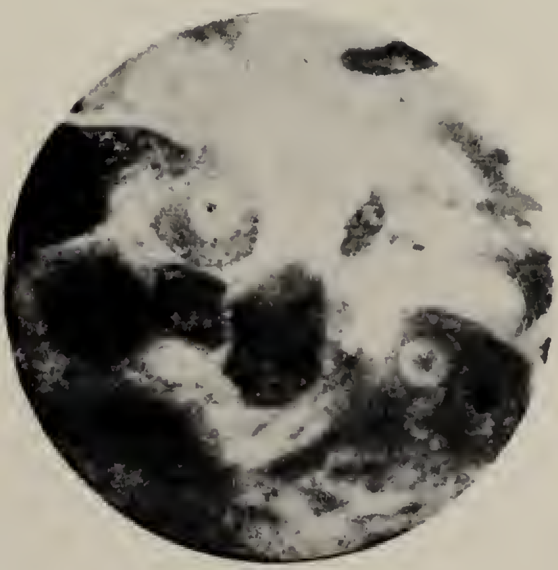


FIG. 29.



SUGGESTIONS FOR THE BIOLOGICAL STUDY OF CANCER.

By Gary N. Calkins, Ph. D.,

Adjunct Professor of Zoology, Columbia University; Consulting Biologist.

It will be unnecessary for me to review in these pages the two sides of the controversy relating to Protozoa as causing certain human diseases. The historical aspect of the cancer problem in this connection has been ably handled by Dr. Park and Dr. Gaylord and needs no *a priori* defense from the biological side. Dr. Gaylord and others are wont to regard the "vaccine bodies" in Vaccinia and in Variola and the cellular inclusions in Carcinoma as similar in nature, and the position which has been taken in this Laboratory in regard to the biological significance of these inclusions is well known. Thanks to the discoveries of Dr. Councilman we now know that the "vaccine bodies" form one phase of the life-history of the protozoan organism which causes smallpox, while other stages, found only in Variola, penetrate the nucleus and give rise to cell inclusions of a very different type. It has been my privilege to work out the entire life-cycle of the smallpox organism upon material provided by Dr. Councilman, and the question as to the specific organism of smallpox is no longer open to doubt. Many of the other diseases belonging to the same group as smallpox (the exanthemata) will in all probability be shown to have a like etiology.

The fact that the cause of a malignant disease like smallpox, which has baffled scientific research for so many years, can be traced directly to a protozoon having a definite systematic position must strengthen the contention made for a like origin of cancer. Notwithstanding the wide difference in the clinical aspects of the two diseases, this is particularly so when we consider the striking similarity existing between the " vaccine bodies " and some forms of the cell inclusions of cancer. Such a contention should be made, however, only as a working hypothesis, and until material is obtained which will demonstrate without doubt that the inclusions in Carcinoma are phases of an organism the advocates of this hypothesis should be content to work upon the possibility alone.

It would be very difficult at the outset to plan out a series of conclusive experiments demonstrating the presence and activity of a specific micro-organism as the cause of Carcinoma. The chance of hitting upon a successful experiment would be extremely slight, and the possibility of finding an ectogenous phase of such an organism would be small indeed. To my mind it would be far more profitable scientifically to work out in clear detail some well-known growth due to a specific protozoon, such, for example, as the study suggested by Dr. Gaylord of the tumorous outgrowths in some vegetables which are known to be due to the specific organism *Plasmodiophora brassicæ.* In the second place, inclusions in carcinomatous tissues should be studied by specialists trained to the study of Protozoa and not left exclusively to pathologists, many of whom regard all structures which are to them incomprehensible, as some type of degeneration product of the cell. Such a study, made with the best methods and the best technique that the zoological side can afford, should lead to an independent point of view and should give definite results which, together with those of the pathologist, the chemist, the physiologist and the surgeon, should give a clear conception if not a solution of the general problem of Carcinoma.

In the third place, to my mind the problem should be attacked from the physiological and chemical point of view, with especial reference to the possibility of specific activity of toxins of micro-organism origin.

In the fourth place, when the morphological side has yielded all its possibilities, the experimental side, strictly speaking, may well give some definite and conclusive results. Such experiments based upon the knowledge of the life-history of the possible organism would then produce results without loss of time, for by analogy with other

Protozoa we would know what phases of the life-history of the organism would give best results.

The first work that I wish to do in connection with the cancer problem is to make a thorough study of the morphology of the cell inclusions, using the most careful technical methods, and to compare these structures with the developmental phases of all kinds of Protozoa where such development is known. A great amount of literature has accumulated in regard to these cell inclusions, and many structures which have been described by various observers may well be taken as a basis for observations from the biological point of view, although such structures may have been variously interpreted as degeneration products, as secretions, or what not, by the various observers. Thus the work of Sawtschenko, based upon carefully prepared material and with accurate illustrations, and later the work of Borrel, based upon an equally efficient technique, have given a basis for my own observations on the carcinomatous cell inclusions. This morphological work is far from complete and is not yet in form for publication, but enough evidence has been independently acquired to justify the provisional assumption that these cell inclusions are neither secretions, as Greenough describes, nor degeneration products of the cell, as most pathologists very generally describe, nor are they modified centrosomes and spheres, as Borrel maintains, but phases of an organism belonging to the group Protozoa. This is based upon the discovery, not only of amœboid forms enclosed within the characteristic capsule which is typical of the so-called "Plimmer's bodies," but upon reproductive phases, upon nuclear changes and upon characteristic morphological protozoan structures. There is reason to believe that the capsule mentioned above is not a part of the organism but a more or less specific modification of the surrounding plasm through the action of a toxic substance created by the organism. Such a conclusion is strengthened, first, by the fact that when the inclusions are in the cytoplasm the capsules have the characteristic cytoplasmic staining reactions, while when these same structures are within the nucleus, where I have repeatedly found them, the capsules take the characteristic chromatin stains. Second, by the fact that, with what may be interpreted as possible later stages of the organism, the capsule is much thicker than in the supposed younger phases, a fact which can be interpreted only as due to the continued activity of some formative cause.

While such structures justify the provisional assumption of a protozoan organism in cancerous tissue, they do not justify the contention that their presence is the cause of cancer, nor is there enough evidence as yet to indicate in what group of Protozoa the possible organism belongs. Feinberg, in a recent paper, lays himself open to criticism by his unproved assumption that these inclusions have a characteristic protozoan nucleus and he follows Korotneff, Behla and others in giving a new generic and a new specific name to the supposed organism, which, as *Histosporidium carcinomatosum*, he is unable to place in any known group of Protozoa. His principal argument—the structure of the nucleus—is weakened because of the complete oversight of the great numbers of Protozoa in which the nuclear structures do not agree with his "type." If this inclusion is an organism we may look not only for such "typical nuclei" but also for nuclear structures and nuclear processes like those of bacteria or certain of the lower Mastigophora, where a definite morphological nucleus is wanting and where structures are found which Hertwig has described under the name *Chromidien*, and which I have described as "distributed nuclei." It is certainly conceivable that, living as intra-cellular parasites, there is no need of a functional nucleus, except for reproduction, any more than a tapeworm has need of a digestive tract.

It might be of interest in the present place to point out one or two biological interpretations concerning the origin of tumorous growths in human tissues. It is quite difficult, indeed, to separate such interpretations from pathological conceptions, but in one or two cases at least the attempt has been made. Quite recently Boveri, studying the question of heredity on the cytological basis, was able to show that the chromosomes, which are definite chromatin structures of a certain size and always of the same number for the same species of animal or plant, have each a specific part to play in the organism.

Thus, in the egg cell of a sea-urchin, where the nucleus of the fertilized egg contains thirty-six chromosomes, if some of these chromosomes are removed, as Boveri was able to do by ingenious experiments, the result is a deformed embryo. Further, the deformity depends upon the nature of the chromosomes that are removed. Boveri concluded from these experiments that each chromosome of the egg defines a certain localized area or set of structures in the adult organism; and further, he maintained that should anything cause the displacement or removal of the chromosomes an abnormal development would result. Applying this result to the question of malignant tumors, Boveri assumed that the well-known atypical division figures of carcinomatous tissue give the chance for an irregular distribution of the chromosomes to the daughter cells; and, he argued, in this way the typical number and arrangement of the chromosomes are disturbed, with an abnormal growth as the result. Ingenious as this theory is, it nevertheless begs the question as to the origin of the tumor, for it leaves unexplained the cause of the irregular division figure and the continuation of such irregularity, which cannot be considered in any sense a normal process, and which therefore must be ascribed to something abnormal in the organization—possibly a toxin of organic origin, possibly an enzyme of other origin.

Quite a different hypothesis was offered last year by the writer and based upon experiments made on animals even more remote from the human organism than the sea-urchin. The experiments were undertaken with the purpose of ascertaining the length of time that a protozoan organism could live upon the same diet and without the intervention of the usual and normal sexual processes. A single individual of *Paramœcium caudatum* was isolated in a small chamber containing a limited supply of food medium, hay infusion. At the end of twenty-four hours the individual divided; that is, reproduced asexually, and two organisms were found the next day in the cell. Each was isolated as the first one was and treated in the same way, the result being four individuals at the end of forty-eight hours. These were again isolated and the process repeated day after day and generation after generation for a period of twenty-three months, or until the race died out from what was unmistakably protoplasmic old age, in the 742d generation. Paramœcium had been studied in like manner previously by two different observers, each of whom found that the vitality of the organisms gave out at the end of the 150th to the 170th generation, when the entire race died. A similar experience threatened the cultures which I had undertaken, for at the end of such a cycle the individuals began to die at an alarming rate and showed unmistakable signs of physiological exhaustion. The survivors, however, were given a change of diet in the form of beef extract in place of hay infusion for one thing, while a simple salt (potassium phosphate) was also used. In both cases the result of the change was a renewal of physiological activity, or a rejuvenescence, and with the new potential of vitality thus obtained, a new cycle of 170 odd generations was started. The process had to be repeated at the expiration of this second cycle and a stimulus was again necessary to save the race. A third time the process was repeated, but the renewal of activity was not as satisfactory as the earlier experiences, and at the fourth period all efforts to rejuvenate were futile and the race died out from protoplasmic senility.

The point of this experiment in the present connection is that a stimulus of artificial nature gives a renewal of vitality to physiological processes which have become weakened through continued activity. An ordinary cycle of Paramœcium of 170 generations might be compared with a given tissue in the human organism, the difference being that the cell progeny from the primordial cell in Paramœcium remain separated, while in the tissue the progeny from the original cell remain connected and become differentiated. In the paper which was published last year the suggestion was made that such tissues run through their dividing activity at a certain period of life and become in respect to that function worn out. A stimulus of some nature may, like the change of diet in Paramœcium, or like the potassium phosphate, renew the vitality of some one or more of these worn-out cells and cause them to proliferate. Such proliferation at an unusual time and in the full-grown organism could give rise to but one result, namely, a pathological growth.

The point now arises as to the nature of the stimulus. A chemical substance, such as a toxin, might do it in the same way that potassium phosphate stimulates the worn out race of Paramœcieum, and the toxin might be produced by an included organism. That this toxin production is possible with protozoan parasites is demonstrated by the well-known case of Malaria, in which the pyrexial attacks are due to the liberation of substances produced by the malaria organisms.

It can do no harm certainly and it may lead to positive results to carry out a series of experiments upon the basis of the above hypothesis, and the morphological work will combine with the physiological and chemical to this end.

REPORT OF THE BIOLOGICAL CHEMICAL DEPARTMENT.

By G. H. A. Clowes, Ph. D.

The study of the cancer problem from a biological standpoint is one which must be approached from several different sides simultaneously in order to obtain a clear conception of its importance. Such work should be carefully elaborated and every detail confirmed by means of duplicate experiments before the results are published. A large amount of fruitless work has been carried out in the past, owing to the fact that individual investigators have frequently taken up a single phase of the subject, disregarding other possibilities than those which they themselves had in view, and have based their results upon single experiments which have subsequently proved to be incorrect. Bearing these facts in mind we laid down in a previous report a scheme of work to be followed out in this department so soon as it should be possible to carry on such work under favorable conditions. Since the establishment of our new Laboratory the work which had previously been confined to simple experiments, mostly with reference to various forms of parasites which were supposed to play a part in the causation of cancer, was extended to more elaborate experiments, many of them of a strictly chemical nature.

The subject was treated under three main heads: I. The study of Metabolism as it exists in patients suffering from cancer as compared with normal individuals and those suffering from other diseases. This portion of the subject involves study of the stomach contents, blood, urine, etc., and will be dealt with more fully at a later period. II. Experiments made with a view to obtaining evidence regarding the cause of cancer, and if a parasite should be that cause, of determining what is the nature of the parasite. Biological-chemical experiments of this nature are mostly micro-chemical and usually based upon theoretical considerations, and the evidence to be obtained from them must be looked upon as more or less circumstantial. III. Attempts have been made to cure cases suffering from cancer by means of serum therapeutic treatment and the use of various chemical agencies, the probable value of which has been indicated by the experiments made under the head of Metabolism. Under this heading curative effects produced by the X-rays have been carefully studied with a view to discovering their mode of action.

The work included under the heading of I, " Metabolism," and III, " The Treatment of Cancer," is necessarily very complicated and slow in giving results. The frequent errors in diagnosis, even on the part of the most expert physicians, the death of patients and their removal from the hospitals, and the fact that our experiments are necessarily more or less confined to incurable cases, makes it necessary to be extremely conservative in any statements regarding results until those results have been established in a large number of similar cases, and until a sufficient length of time has been allowed to intervene in order to obtain definite data regarding the course of the disease.

Part I may be subdivided into:

a. Study of the secretions of the stomach in cancer as compared with the results found in other diseases and under normal conditions.

b. Examination of the blood of cancer patients with a view to discovering any abnormal constituents, either toxins or chemical products due to abnormal cellular metabolism; also a comparison of the relative proportion of certain constituents of the blood under normal and pathological conditions in which cancer and other related diseases are involved.

c. Study of urine and excreta, especially during the last stages of cancer comparing the proportions of the various normal and abnormal constituents at various periods of the disease with those found under normal conditions.

d. A chemical examination of various transudates and exudates found in patients suffering from cancer.

e. Chemical analyses of tumors themselves as compared with normal tissue, and an examination of such tumors from a toxicological standpoint.

f. A careful comparative study from a chemical standpoint of tumors supposed to be derived from the cells of other organs present in the body, with a view to proving whether these derived tumors possess the same properties and contain the same chemical bodies and enzymes as those cells from which they are derived.

A large amount of work has been carried out under each of these separate headings:

a. Study of from 30 to 40 stomach contents, 8 of which were diagnosed as cancer of the stomach. It has been established without any doubt that the hydrochloric acid secretion in the stomach is not in any sense proportional to the peptic activity; that hydrochloric acid is not necessarily absent in cancer of the stomach, and that the total absence of hydrochloric acid, accompanied by lactic acid, is not necessarily indicative of cancer. The writer has attempted in every case to fractionate the products of peptic digestion, and if possible to prove some relationship between the amount of so-called free and combined hydrochloric acid with one or more fractions of the digested proteids. In carrying out this work it has been observed that the methods ordinarily adopted in analyzing stomach contents are extremely faulty, certain constituents which are normally absent being included, while others which are normally present are incorrectly estimated and included in the wrong part of the analysis. It is not possible to go further into detail regarding this work at the present moment, but a paper fully covering the subject of the analysis of stomach contents, peptic activity and hydrochloric acid in the stomach secretions in cancer as compared with other diseases, and the bearing which these results have upon the whole problem of cancer metabolism will shortly be published in one of the medical chemical journals.

b. Exact analyses of the blood as a whole, of the serum and corpuscles, have been made in four cases of cancer; in each case the diagnosis had been confirmed either by an operation or autopsy. Also analyses of the blood of animals suffering from cancer have been made and these results have been compared with those obtained from a large number of normal individuals. In each case we observed diminution in the alkalinity as compared with the normal. Chlorides and certain other constituents were undoubtedly high, while the fractionation of the nitrogenous compounds showed the presence of certain bodies which are probably not present normally, or at least in smaller proportions. Further enzymes, such as oxydases and toxins capable of affecting red blood corpuscles, were also considered, but so far, perhaps owing to the small amount of material at our disposal, it has not been possible to bring positive proof of any of these bodies being present in proportions deviating to any considerable extent from the normal. The difficulty of such an investigation either from a chemical or biological standpoint will be realized when it is remembered that the cachexia obtaining at the last stages of cancer is frequently complicated by secondary changes in the tumor itself, due to the destructive influence of bacteria, the excretory products of which seriously complicate the problem.

c. Urinalyses. Under this heading must be considered several long series of urinalyses carried out from day to day, frequently covering periods of three and four weeks, during which the greatest care has been taken to secure full twenty-four hour samples without any loss of material. In a few cases the influence of diet has been carefully considered, an exact record of the food consumed having been made, and on comparison of the analyses of the food and urine from day to day it has been possible to observe the progress of the patient. In dealing with this subject it has been our endeavor to arrive at exact results under three principal headings: 1. Variations of normal constituents of the urine in cancer. 2. The influence upon the katabolism of the organism produced by varying diet and the therapeutic treatment. 3. The presence of abnormal constituents, their proportions if considerable, and especially has it been our endeavor to discover some body or bodies characteristic of cancerous urine which might be made use of for the purpose of early diagnosis. Experiments have been frequently interrupted or have miscarried owing principally to the difficulty of controlling patients, but our results have on the whole been fairly constant, and it is to be hoped that in the course of the next few months we shall have accumulated enough material along these lines to justify publication. It has already been found possible in certain cases to determine the location of the tumor from the nature and proportion of the bodies found in the urine. It must, however, be carefully borne in mind that many results of this sort are probably of a secondary nature, rather due to disturbance of normal cell metabolism than to the production of abnormal constituents by the cancer cells. The fact, for example, that cancerous urine is extremely toxic for animals has long been known, and repeating the experiments of previous investigators, we have been led to conclude that this action is due rather to the abnormal state of the patient, whose metabolism has been so interfered with that a large number of suboxidized bodies are excreted with the urine, which, if properly oxidized, would exert far less toxic action than to the influence of any specific toxin. We have also commenced series of experiments regarding the effect produced in the urine by the injection directly into the tumor mass itself of certain chemical substances.

d. Three peritoneal transudates have been examined chemically In one the exact secretion by this means of chlorides, of various nitrogenous constituents from day to day was accurately determined, and the figures obtained will be of value in the general study of metabolism which we propose to elaborate at a later date. Experiments made with this material on animals with a view to inducing immunity will be referred to later. It should be noted under this heading, as well as in the case of urine previously referred to, that a large number of investigators have described what they supposed to be unique chemical products characteristic of cancer which they had discovered and isolated. The repetition of their work by the writer has invariably led him to the conclusion that they had mistaken well-known normal products of metabolism for something of a more complicated nature.

e. The chemical analyses of ordinary tumors have not shown anything very remarkable or particularly worthy of interest, consequently very little time has been devoted to that branch of the subject. Also, on examination for toxins by disintegrating the tumor mass, filtering through a bougie under pressure, whereby bacteria, etc., are removed, it has not been found possible to produce any marked toxic effects except in those cases in which a secondary decomposition of the tumor mass had taken place.

f. Investigation of chemical constituents of tumors derived from specific cells. Previous investigators have proven that tumors derived from the thyroid gland contain iodine and are capable of reacting in many respects as do the thyroids themselves. Bearing this in mind we examined a hypernephrom supposed to be derived from the adrenal, with a view to observing the nature of its chemical constituents and whether it contained a body capable of exerting the same effect upon the blood pressure as does the extract of normal adrenals. Unfortunately the only good specimen which has been put at our disposal had previously been placed in formaldehyde and subsequently in alcohol, so that the negative results which we obtained were only to be expected. The other cases which we examined proved on subsequent pathological diagnosis not to be hypernephromate. We are looking for fresh material in order to repeat our own experiments and also to confirm those recently published by Crofton. Making use of formaldehyde hardened material, we have been unable to obtain a differentiation of the tumor material from normal kidney and other tissues by means of his iodine reaction with the same facility that he claims for it.

II. Regarding the cause of cancer and the nature of the probable parasite. In studying biological problems involved in cancer from a chemical standpoint, with a view to establishing the exact nature of the disease, and if possible obtaining evidence regarding its cause, we have endeavored to free our mind entirely of the preconceived notions held by the majority of those who are working in this subject. The notions referred to are frequently based on observations made by means of the microscope on sections of tissue which, in the course of the hardening and staining processes to which they have been submitted, have undoubtedly undergone very considerable morphological and chemical changes so that no absolute significance should be attributed to them, whereas they are undoubtedly of very great value as a means of supporting evidence obtained in other ways. Strictly chemical work under this heading is almost entirely of a microscopical nature. An examination of yeasts and protozoa of various types (Plasmodiophora Brassicæ) compared with fresh cancer material has been carried out, and most of the work under that head has been incorporated in previous reports made by Dr. Gaylord and will not therefore be considered at this stage. Certain cells normally found in cancer and known as mast cells have been investigated in hopes of determining their chemical nature and in that way obtaining some insight regarding their function in the tissue. The results of a series of such micro-chemical experiments, when completed, will be published in a microscopical journal and will, we hope, serve to bear out the statement previously made regarding the influence exerted by the chemical bodies to which the tissue is submitted during the hardening and staining processes.

III. As regards the cure and treatment of cancer, other than by means of the X-rays, a very little can be said at present. As stated above we have only been able to make use of inoperable cases, which, under normal circumstances, should be expected to succumb in the course of a few weeks or months as the case might be. We have tried the serum treatment, following the lines usually adopted in the treatment of other diseases in which the infective agent is known but without any marked result, which was to be expected when the probable nature of a cancer parasite is considered. In the paper preceding this, written by Dr. Gaylord, and dealing with the probable nature of a cancer parasite, it will be seen how completely such an organism deviates from bacteria and how impossible it is to draw any conclusions regarding its mode of development, so-called culture and mode of transmission, or regarding as a possible means of inducing an immunity, against it along the lines already developed in bacteriology. From various considerations it it is highly probable that any such organism has so much in common with the normal elements of the blood as to make an immunity established against it practically result in auto-intoxication. This is a subject, however, which is not sufficiently investigated at present and must be referred to a later period. The author has in the course of the last few months collected and abstracted all the literature bearing upon the subject of immunity in general, and especially all that which would have any possible bearing on the cancer problem, and is firmly convinced that any attempt to treat that phase of the subject in the same way as previous problems in immunity have been handled will fail to yield results. Some entirely new conception of the whole problem must be evolved.

We have investigated the effect produced by normal sera and so-called immune sera. Also that of certain chemicals which we were led from our metabolism experiments to suppose would exert a specific effect upon the development of the tumor. These experiments have undoubtedly in a few cases retarded to a certain extent the development of the cancer and even produced a considerable diminution in size, and have also in certain cases alleviated the pain, but we are not very sanguine regarding such treatment and should not wish to suggest its general application at present. We shall, however, in the course of another year have ample opportunity to make some accurate observations under this head.

The treatment by means of X-rays is being fully dealt with by Dr. Park in another publication. In conjunction with that work we have made observations from time to time regarding the metabolism of individuals suffering from cancer who were undergoing the treatment. We are also at the present time carrying out a very elaborate series of experiments on normal and diseased animals with a view to arriving at a clear conception of the mode of action of the X-rays upon the tissue, the effects they produced in the blood and urine, etc., and from what we have so far obtained, it seems probable that we shall be able in the course of time to gain a clearer insight regarding the nature of the action produced by these physicial agencies in the living body.

To summarize the results obtained, it may be said that a large amount of work bearing on widely different phases of the subject is in the course of completion; only a few of the less important pieces of work have been entirely finished and much that has a very significant bearing upon the subject has barely been commenced. In the course of the last year, since our new laboratory was established, the greater part of the strictly chemical work, involving many hundreds of analyses, has been carried out. Such a work of necessity takes a considerable amount of time. It would be useless to approach such a subject from any one point of view, as has been done by so many investigators previously without success. To cover the subject completely it was necessary to start the work upon a large scale, upon such a scale that it has been found impossible to arrive at any positive conclusions up to the present. This is partly owing to the difficulty of obtaining exactly that material which one most requires. In spite of the fact that we are situated in a so-called cancer district, the amount of material at our disposal is not so large as might be wished, and work on certain types of rare tumors must frequently be postponed for a year or more for want of material. Consequently it is our endeavor to carry on work continuously on that material which is most readily available, and in addition, when the opportunity offers to investigate those more unique cases which are hard to obtain. Owing to the fact that so many errors have been made in the past by the publication of results based on too small an amount of material we have resolutely adhered to our original intention of refusing to publish any results which have not received repeated confirmation. We have also made a point of confirming all data regarding normal conditions of metabolism where any question of deviation from the normal was involved, since the figures stated by pathologists are frequently extremely incorrect.

In conclusion it may be said that the work so far carried out in the Laboratory, together with the greater portion of the literature bearing directly or indirectly upon the subject, harmonizes with the views held by Dr. Gaylord regarding the probable parasite of cancer, as published in a previous portion of this report. The evidence which will be adduced in support of the theory from a biological-chemical standpoint, is of course indirect, but in such a case indirect evidence is of considerable value, and the fact that it is difficult to explain the proliferation of cancerous tissue from a physiological-chemical standpoint, without the intermediate action of some such organism foreign to the body itself (as has been attempted by some recent investigators) is in itself a support of the parasitic theory.

February 1, 1903.

TREATMENT OF CANCER.

By G. H. A. Clowes, Ph. D., and Herman G. Matzinger, M. D.

A series of cases suffering from cancer have been submitted to a chemical treatment based upon the results obtained in the chemical laboratory with reference to the metabolism of patients suffering from cancer. We should prefer not to make any definite statements on the subject at present, as sufficient time has not been permitted to intervene since the commencement of these experiments in order that proper observations should be made, but we have to record a considerable improvement in the condition of several patients, a disappearance of pain, and marked retardation in the development of the tumor mass, and in some cases a considerable diminution in its size.

Further details regarding this mode of treatment will, we hope, be elaborated in the course of the next year, when we shall be in a position to publish our experiments.

February 1, 1903.

A NOTE ON THE TOXIC AND VITAL THEORIES REGARDING THE CAUSATION OF CANCER AND THEIR BEARING UPON THE PARASITIC THEORY.

By G. H. A. Clowes, Ph. D.

The theory has recently been advanced in several prominent publications that the proliferation of the cells of malignant tumors may be attributed to the action either of toxins or of chemical bodies resulting from abnormal cell metabolism. This statement is usually made without further qualification, leaving the reader to form his own opinion regarding the exact nature of the reaction involved. It must, however, be borne in mind that a toxin or chemical body capable of producing the phenomena observed in cancer should scarcely be the product of the normal or abnormal metabolism of human cells, without the intervention of some external agency; and it is with the intention of showing that the phenomena in question may most readily be attributed to the intervention of some form of parasite that a few points worthy of interest will be briefly referred to at this stage.

If we are willing to assume (and it can scarcely be doubted in view of the existing evidence) that some toxic or chemical body plays an important role in causing the cells of malignant tumors to proliferate, the question may well be asked, From what source is this body derived and how does it exert its specific action on the cell? Three possible alternatives may be considered:

1. Some interference with its normal function gives rise to the production within the cell of a toxin or chemical body capable of exerting a specific action upon the cell and thereby stimulating it to abnormal development.

2. Some toxin, generated possibly at a considerable distance from the point at which the tumor commences but possessed of an affinity

for that particular type of cell, is absorbed by the latter and stimulates it to proliferate.

3. The parasite infecting the cell and itself proliferating and producing a toxin capable of exerting an irritating action on the host cell causes the latter to proliferate.

The first and second alternatives may readily be disposed of in view of the following facts:

A toxin can never (so far as we know) reproduce itself or aid in its own reproduction. It either produces no result, or it exerts a more or less pronounced action on the cell exposed to it; if that action is too great for the cell to overcome, the latter succumbs. If, on the contrary, the cell is capable of counteracting its toxic activity, an antitoxin will probably be produced. A similar line of reasoning applies to the action of a simple chemical body which is capable of exerting a poisonous action. It reacts with those groups in the cell protoplasm for which it possesses the maximum affinity, and if the quantity introduced is sufficient the cell is destroyed. If this is not the case, the chemical body in question, together with those portions of the protoplasm which have been disturbed by its action, are removed in the ordinary course of cell metabolism; and unless a fresh supply of the same body is introduced in continually increasing quantities the stimulation of the cell by this means ceases.

In view of these facts it is evident that even were it possible for a toxin or chemical body (produced under abnormal conditions within the cell itself) to stimulate the latter sufficiently to bring about proliferation (which is highly improbable) the body in question would rapidly become exhausted, or at least diluted to such an extent as to render further proliferation under its influence out of the question. As was stated above, such bodies are quite incapable of helping to reproduce themselves; the reverse would rather be expected. One is therefore in order to uphold the possibility of the first alternative (mentioned above) forced to the conclusion that the fresh cells derived from the original cell which first proliferated have inherited the power of reproducing within themselves that stimulating agent, toxic or otherwise, under whose influence they themselves will subsequently be forced to undergo further proliferation.

Such an assumption is quite unwarranted. No analogy for any such action exists in nature, and any such theory may be summarily dismissed in view of the fact that the principal difficulty which it presents (i. e., the source of supply of the ever increasing quantities of toxic material required to stimulate the increasing number of tumor cells) may so readily be explained by assuming the presence of a parasite, as will be shown later.

A second alternative, that the toxin in question is produced in an entirely different portion of the body from that in which the particular cells involved are located, may also be disposed of by means of similar arguments. It must be borne in mind that this toxin would have to exert a selective action; it would have to possess an affinity for one particular type of cells, but why then should it select any one particular cell, or, having selected that cell, why should it further show a preference for the derivatives of that particular cell after repeated proliferation has taken place? Further, the toxin in question would have to be supplied in ever increasing quantities from without the cell, for as stated in the argument brought against the possible production of a toxin or chemical body within the cell itself it is quite inconceivable that such a body introduced from without should lead to the continuous reproduction of itself within the cell in question and its derivatives. It is, on the contrary, highly probable that an antitoxin or antibody would be produced, or that the cells would become so accustomed to its action as to be less readily stimulated to proliferation than the surrounding cells of the same species. From these considerations it will be seen that when the cell undergoes subdivision in order to counteract the influence of any poisonous body to the action of which it may be exposed it is highly improbable that the derivatives of that cell would be endowed with the faculty of reproducing that particular type of poison, or that they would be more susceptible to its influence than are the surrounding cells of the same type. The opposite result might be expected in both cases.

The third and only explanation of proliferation of the cells of malignant tumors as being due to the action of some toxic body which has any significance, or is in any way borne out by the facts with which we are acquainted, is that the cell in question has become infected with some type of parasite which itself proliferates and produces toxins which in their turn react upon the host cell, compelling it to undergo subdivision in self-defense. It must be borne in mind that the encounter taking place under such circumstances between the host cell and the parasite which has been introduced is one in which the excreta of the parasite play a very important part. It is by this means alone that the parasite is enabled to protect itself against the forces normally possessed by the cell whereby the latter is enabled to destroy and assimilate or eject any foreign body finding its way into its protoplasm. The parasite being once established naturally proliferates and its excreta and the toxins which it probably produces cause such inconvenience to the host cell that in order to diminish the number of parasites per cell and consequently the concentration of toxins the cell itself proliferates. It then becomes a question of the relative speed at which host cells and the parasites within them proliferate, and the relative toxicity of the excreta of the parasites as to whether the host cells by continual proliferation eventually succeed in entirely overcoming the parasites, or whether owing to a uniform and continuous subdivision both of host cells and parasites an exact condition of equilibrium is established; or whether as a third alternative the parasite succeeds in entirely exhausting the cell, in which case the parasite would in all probability form some type of permanent spore which would no longer produce toxins capable of affecting the surrounding tissue.

For such a mode of procedure we have a good analogy in the case of certain forms of paramœcia, which, on becoming infected by lower types of parasites, frequently proliferate and in that way are enabled to recover from the infection. (See Metchnikoff, *L'Immunité*, page 20.)

Another rather ingenious but extremely farfetched suggestion is that made by Foulerton, who attempts to account for the proliferation of epithelial cells by assuming that up to that point the cells in question have been restrained in their natural tendency to develop by the action of some antibody induced by reactive materials which are continually passing into the system from organs undergoing degeneration. This line of argument is so involved and introduces so many assumptions for which we have no analogy that it is hardly necessary to consider it in comparison with the much simpler explanation of toxic activity previously referred to in connection with the parasitic theory. It is, however, our intention to treat this subject more fully at a later period.

It must be borne in mind in dealing with this phase of the subject, just as it has been shown in Dr. Gaylord's contribution to this report, that the question regarding the existence or non-existence of a parasite in cancer cannot be decided by making use of generally accepted bacteriological principles, so it will probably be found necessary to treat the questions involved in toxic and chemical activity in a manner entirely different to that employed so successfully at the present moment in dealing with those problems in which bacteria and their products are concerned.

February 1, 1903.

A STATISTICAL STUDY OF A RURAL CANCER DISTRICT IN THE STATE OF NEW YORK.

By Irving Phillips Lyon, M. D.

BROOKFIELD, MADISON COUNTY, NEW YORK.

I selected this place for investigation as the result of a detailed compilation and analysis of the mortality statistics published in the Monthly Bulletin of the New York State Board of Health for a period of years, the substance of which analysis showed that, of the various sanitary districts into which the State is divided, the East Central District* presented the highest death-rate from cancer, and of the many specified localities in this district, for which separate figures were given, the township of Brookfield, in Madison county, showed the highest cancer mortality rate. In fact, Brookfield** was distinguished from all the other specified localities of the district by a death-rate from cancer which was not even approximated by any other place, and this rate was determined on the basis of the entire period, 1887-1900.

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*For the year 1900 the cancer mortality per 100,000 of population in the different sanitary districts ranged from a minimum of 59.2 to a maximum of 82, as follows:

1. Adirondack and Northern District, 59.2 per 100,000 population.
2. Maritime District, 63.5 per 100,000 population.
3. Lake Ontario and Western District, 64.9 per 100,000 population.
4. Southern Tier District, 66.8 per 100,000 population.
5. Hudson Valley District, 69.1 per 100,000 population.
6. Mohawk Valley District, 71.9 per 100,000 population.
7. West Central District, 73.4 per 100,000 population.
8. East Central District, 82 per 100,000 population.

Whole State, mean, 67 per 100,000 population.

**The Brookfield death-rate from cancer per 100,000 population for the period 1887-1900 was 149, based upon the returns published in the Monthly Bulletin of the New York State Board of Health. The highest rate for any other specified locality in the East Central District was approximately 102 (Delhi).

Having thus determined a locality of remarkable cancer mortality, I went to Brookfield in December, 1901, and again in May, 1902, and made a careful personal study of the local cancer incidence and of the various special conditions and factors that might be related to it.

Description of Brookfield.—The township of Brookfield lies close to the center of the State of New York, in Madison county. Its extent is roughly ten by eight miles, embracing approximately seventy-five square miles of territory. The country is very rough and hilly, partly wooded, and generally covered with poor farm lands and grazing hillsides. It is well drained from its hillsides into occasional brooks and small streams. Agriculture* and dairy farming are the only occupations of the people. There are no factories in the township. The population of the entire township in 1900 was only 2,726, of which number 485 lived in the village of Brookfield. Besides this principal village, the township includes the village of Leonardsville, somewhat smaller in population than Brookfield village; North Brookfield village with about 200 inhabitants, and the hamlet of South Brookfield, with a few houses clustered at crossroads. The township of Brookfield is therefore strictly rural.

Collection and classification of statistics.—I began my study by an investigation of the official register of births and deaths in the town clerk's office. I made a transcript therefrom of every death certificate in which the immediate or the accessory cause of death was assigned as cancer or malignant tumor of any variety. I did the same for all cases in which the assigned causes of death, where inexactly stated, suggested cancer as the real cause. With these transcripts in hand I visited the physicians who had signed the original death certificates and made a thorough canvass of the

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*There has been claimed to exist, by certain writers, a possible etiological relation to cancer of a disease in cabbages, turnips, beets, etc., known as "clubfoot disease," "root disease," etc., this plant disease being caused by a microorganism called *Plasmodiophora Brassicæ.* It is not inappropriate, therefore, to mention here that "clubfoot disease" has extensively prevailed in Brookfield and the surrounding country and has been known, in some instances, to destroy a large part of a farmer's cabbage crop.

medical history, symptoms, signs and facts relating to each case. In a small minority of cases in which the original medical attendants were dead or inaccessible I either accepted the records at their face value or, where possible, obtained confirmatory or negatory evidence from the other living practitioners, who as consultants had had personal knowledge of the cases in question. As the result of this cross-examination of the various physicians I determined the actual number of deaths in which they affirmed and insisted upon cancer (including all forms of malignant tumor) as the cause of death either immediate or accessory, and I completed my records on this basis. I included in this enumeration all cases in which a malignant growth existed in the patient at the time of death, whether the physician regarded such malignant growth as the primary and immediate cause of death or as secondary and accessory to some other complications or terminal infection. For it seemed to me immaterial whether, with a general incurable and fatal malignant growth, the patient actually died from the immediate effects of this disease or in addition had and succumbed to nephritis, cerebral hæmorrhage, pneumonia, influenza or other terminal complication.

Accepting then all cases of death in which cancer was diagnosed and affirmed by the physicians, I obtained records of 84 such cases dying in Brookfield during the fifteen-year period, 1886-1900.* The number of deaths assigned to cancer as the cause by the monthly Bulletin of the New York State Board of Health for the same period was 70, 14 less than the number that I found was properly so assignable. This difference is due chiefly to the method employed in the office of the State Board of Health of assigning cases to that cause which is given in the death certificate as the "immediate" cause of death, whether the immediate cause be given as "grippe" and the accessory cause as "cancer" or vice versa. My figures are therefore higher than the State statistics by 20 per cent.

Sex and anatomical distribution.—By sex the 84 cases of cancer were divided into 35 males and 49 females, a usual ratio of the two sexes. The involvement of organs by sex is shown in Table I. Nothing unusual is noted in this distribution.

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*The official records were incomplete prior to 1886.

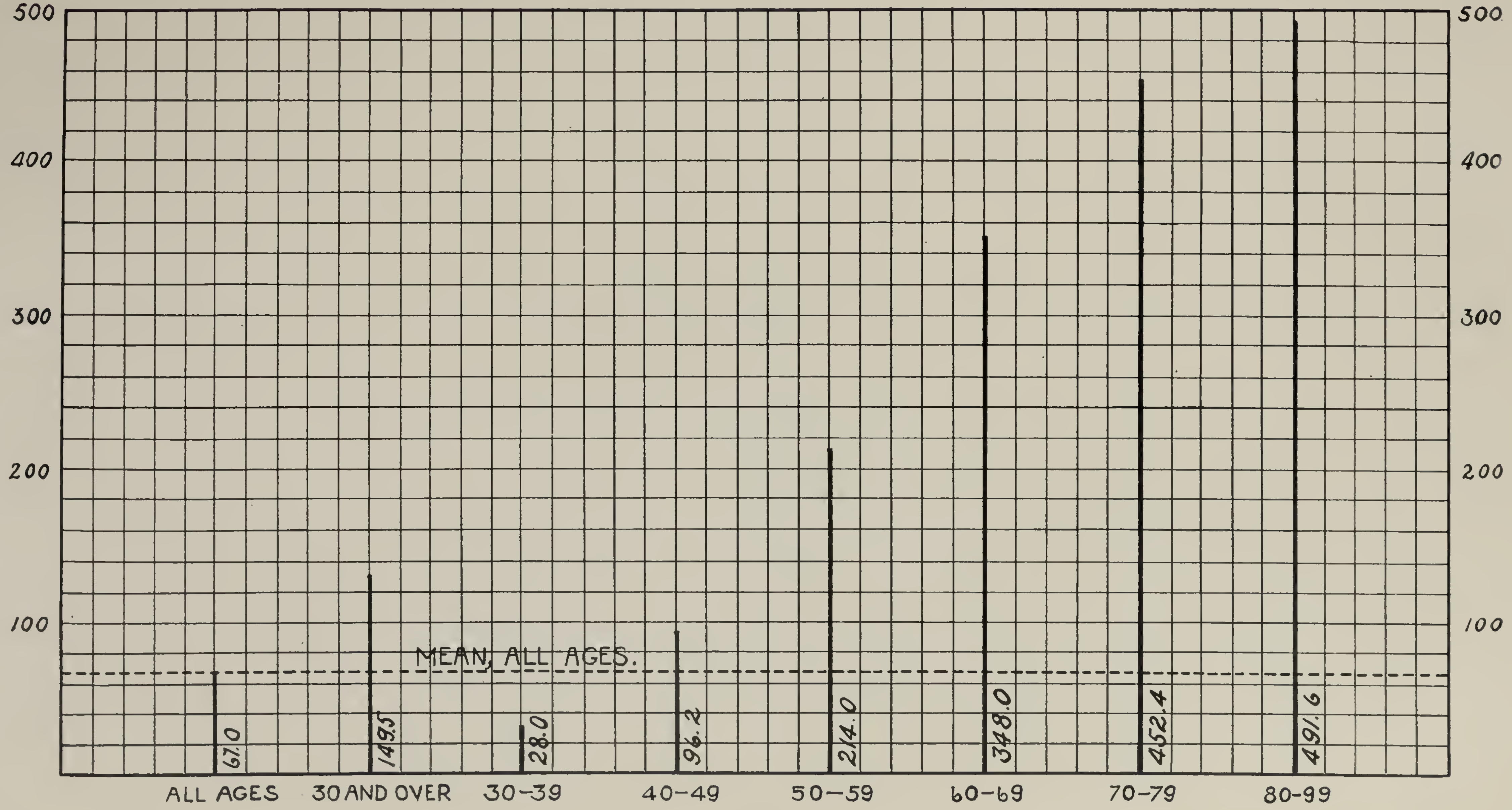
Comparison of cancer death-rates in Brookfield, State of New York, and registration area of United States.—We have then 84 cases dying from cancer in Brookfield during the fifteen-year period, 1886-1900. The number of deaths from all causes in the same period, determined from the town-clerk's official register, was 719. The mean annual population of Brookfield for this period, determined from the United States census, was 3,076. A comparison of these figures shows a most striking and remarkable cancer mortality rate. Thus a mean annual population of 3,076 showed a mean annual mortality of 47.93 from all causes and of 5.60 from cancer, or an annual death-rate from cancer of 1.82 per 1,000 of population. The cancer mortality compared with the general mortality showed one death from cancer in every 8.559 deaths from all causes—11.68 per cent.

How remarkably high this cancer rate is may better be appreciated by comparing it with the corresponding rates for the State of New York, as a whole, and for the census registration area of the United States, the figures for the latter two areas being for the census year 1900 and both being computed from the United States census. Thus compared the annual cancer death-rates per 1,000 of population were for Brookfield, 1.82; for the State of New York, 0.61, and for the United States (census registration area) 0.60, the Brookfield rate being therefore about three times the rate for either of these larger areas. If we take the Brookfield rate obtained from the cancer deaths of Brookfield as given in the Monthly Bulletin of the State Board of Health (1.51 per 1,000 of population) the Brookfield rate is found to be about two and one-half times the rates of the larger areas, or, exactly stated, the ratio of the Brookfield rate to that of the whole State of New York is 2.47 : 1.00.

Are there any general factors that may, in part, account for the high cancer death-rate in Brookfield?—How can this remarkable cancer death-rate, two and one-half times the normal, be accounted for? Are there any well-known factors, recognized by vital statisticians, that may be supposed to have influenced it, or must we seek its explanation entirely outside of such general factors in special and at present unknown or conjectural factors of etiology? Among such

Chart I. *Geographical Representation of the Influence of Age on Cancer Mortality.*

Deaths from Cancer in Each Age Group, per 100,000 Population of Corresponding Age Group, for Massachusetts, in 1895.*



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* Based on "Statistics of Cancer in Massachusetts" by W. F. Whitney, M.D., published in the Thirty-Second Annual Report of the State Board of Health of Massachusetts.

recognized general factors, *longevity* and *error in diagnosis* must be considered in relation to the cancer death-rate, and I shall attempt to demonstrate that each has been operative in determining a part of the cancer mortality in Brookfield.

Influence of longevity on cancer mortality in general.—The relation of age to cancer mortality is too well known to require more than brief mention. A glance at Chart I will show graphically how rapidly cancer death-rates increase for each added decade of life. Thus, for Massachusetts, in 1895 the cancer death-rates per 100,000 of population of corresponding ages increased from 28 for the fourth decade of life to 96 (3.4 times) for the fifth decade; to 214 (7.6 times) for the sixth decade; to 348 (12.4 times) for the seventh decade, and to 452 (16.1 times) for the eighth decade. The increase is sustained through each succeeding decade of life.

Longevity in Brookfield.—Brookfield is a poor rural community, in which a livelihood is with difficulty obtained. As a result there is no increase of the population by immigration, but a continued loss by the emigration of the youth. The birth-rate is low. For the fifteen years 1886-1900 the births exceeded the deaths by only 38. The population has thus decreased, as shown by the United States census, viz., 1880, population, 3,685; 1890, population, 3,260; 1900, population, 2,726. Those who are left to care for the farms and the homes are the *adults, who,* living a simple life in a salubrious climate, *live to advanced age and die old.* The truth of this assertion if fully confirmed by the figures for Brookfield given in Tables II and III, and is made the more striking by comparison with the corresponding figures for the United States registration area. The average age at death from all causes for Brookfield in the period 1886-1900 was 54.4 years,* contrasted with 35.2 years for the registration area of the United States for the census year 1900. Sixty-one per cent of all deaths from all causes in Brookfield occurred in persons over the age of 55 years contrasted with 31 per cent (about one-half) for the United States registration area. For the age of 65 years and over, the corresponding figures for Brookfield and for the United States were, respectively, 49 per cent and 21 per cent. Exactly the reverse is shown for the infant and child mortality of Brookfield compared with the United States. In Brookfield only 17 per cent of deaths occurred under the age of 20 years; in the registration area of the United States, 37 per cent, more than double the rate in Brookfield. Under the age of 35 years (the period of life of relative cancer immunity) only 25 per cent of deaths from all causes in Brookfield occurred, whereas for the United States registration area 50 per cent occurred in this period of life.

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*Determined from the death-records of the town clerk's official register.

Influence of longevity on the cancer mortality of Brookfield.—With the proof then that longevity must have been an important factor in determining the high cancer mortality of Brookfield, what part of this cancer mortality can be accounted for solely by the longevity of the population? This question cannot be answered at once in terms of cancer death-rates per 1,000 of population, by age periods and by sex, for the data for such calculations are not obtainable. We can, however, obtain an answer to this question by indirect means and with a fair degree of accuracy.

If we assume that the cancer period of life is from 30 years of age upward—and this assumption* is approximately correct—it is possible to ascertain for various large bodies of population what percentage of all deaths over 30 years of age is represented by deaths from cancer in the same age period, and thus to establish a certain standard of cancer mortality which we may regard as normal. With such a standard of normal we may compare the corresponding percentage of cancer deaths to total deaths over 30 years of age for Brookfield and thereby obtain the excess above normal in Brookfield.

Tables IV and V contain the figures of this calculation. There is shown a remarkable agreement of the figures for the State of New York, the census registration area of the United States and the New England States. Thus the percentages of cancer deaths to all deaths over 30 years of age for these three areas are, respectively, 6.04, 6.17 and 6.25. So nearly identical are these percentages that one must be impressed, I think, with the view that no element of chance, but rather a general law of proportion, determines them; i. e., determines a standard of normal.

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*So far as Brookfield is concerned, this assumption holds absolutely true, as no deaths from cancer under 30 years of age were recorded.

The marked variation of the figures for Brookfield* from this standard of normal is striking and at once determines the excess over normal of the Brookfield cancer mortality. Thus, as shown in Table V, the ratios of the Brookfield figures to the figures for New York, the United States and the New England States, for all ages over 30 years, are, respectively, 2.08 : 1, 2.04 : 1, and 2.01 : 1; i. e., almost exactly double. And in estimating these ratios I have not used my own determination of the number of deaths from cancer in Brookfield (84 cases) but rather the figures (70 cases) in the official records of the State Board of Health, for manifestly in comparing rates such rates must have been based on a tolerably uniform system of collection and classification in order to be properly compared. And that there may be no misunderstanding of what follows hereafter in this paper I shall say here, once for all, that in comparing the Brookfield cancer death-rate with the corresponding cancer death-rates of other places I have made all estimates of the Brookfield rate on the basis of the 70 deaths from cancer, as given in the official records of the State Board of Health, and not on the 84 cases as determined by my special investigation.

We find, therefore, that the gross cancer mortality of Brookfield, for all ages, is materially reduced by making due allowance for longevity, and that, after making this allowance, the Brookfield cancer rate is still 2.08 times the corresponding rate for the entire State of New York, which (latter) may be taken as the standard of normal. Therefore, of the 70 deaths from cancer in Brookfield, only

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*The law of proportion, determining the standard of normal of cancer deaths to total deaths over the age of 30 years, is strictly applicable only to *similar large bodies of population whose mortality statistics are classified on a common basis.* For with a small population variations from year to year, due to exceptional local conditions, might introduce an appreciable error, which would not be the case with large aggregates of population in which the variations of the component parts are leveled in the average for the whole. In the case of Brookfield, however, the mortality statistics were classified by the State Department of Health on the same basis used for the entire State of New York, and any exceptional variation for a single year has been avoided by taking the mean for a period of 15 years.

33.5 (12.61 : 6.04 : : 70 : x = 33.52) can be accounted for by longevity, and 36.5 remain to be explained by factors other than longevity.

Other factors than longevity influencing cancer mortality in Brookfield.—To account for this excess of 108 per cent, or 36.5 cases above the normal, after making allowance for longevity, we must seek other factors. Evidently among such other factors *error in diagnosis* must be carefully considered.

Error in diagnosis as a factor in the cancer mortality of Brookfield.—Among the active practitioners of medicine in Brookfield I found several conscientious and intelligent physicians, men above the professional ability usual in such a place. Of some others, however, this may not be said. There were physicians who had signed death certificates whose knowledge of medicine was less than meager and whose ideas of diagnosis would have little value.* Moreover, there were certain " cancer specialists " who professed to cure cancer, without the use of the knife, by means of secret preparations applied locally and administered by mouth as " blood cures." The diagnosis of cancer was confirmed in one case by microscopic examination, and in 11 cases by post-mortem section, making only 14 per cent of the diagnosis of cancer determined by means that would be regarded as satisfactory. My confidence in the approximate accuracy of the diagnosis in a part of the cases diagnosed as cancer was therefore shaken, and I determined to ascertain if possible what part of the entire 70 cases could be accounted for by excessive error in diagnosis.

It might seem, on first thought, that such a determination with any degree of accuracy could not be made. However, I found a means to this end that I believe will be accepted as reasonably satisfactory. It depends on the principle of comparing the Brookfield cancer mortality with that of an adjoining similar town, *in both of which places the factors of longevity and error in diagnosis were relatively equal and, therefore, negligible,* as a result of which com-

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*As an example of diagnosis, note the following verbatim extract from one of the death certificates, signed by two physicians: *Immediate cause of death:*—" Rupture of a hydatid into stomach which drowned her by strangulation (5 minutes)."

parison the excess of cancer mortality in Brookfield over that in the adjoining town would represent the part of the Brookfield cancer mortality that was due to factors other than longevity and excessive error in diagnosis. As the part attributable to longevity alone has already been determined, the part due to excessive error in the diagnosis (above the average amount of error in the whole State) can be found by subtraction. The principle of this method cannot be criticised, provided the condition of similarity of the two towns in the respects noted to be a fact. It remains for me, therefore to prove the similarity in the points named of Brookfield and the adjoining town selected for the purpose of the comparison.

The town selected for comparison is Plainfield,* immediately adjoining Brookfield on the east. All that I have said about Brookfield, as to its general character, topography, cultivation, occupation of its people, low birth-rate, emigration of its youth, declining population, longevity of the people and qualifications of the physicians, applies with equal force to Plainfield. The two towns are identical in all these respects. As to longevity and qualifications of the physicians, I must be more specific in order to fortify the general assertion just made. The population of Plainfield was in 1890, 1,025; in 1900, 897—a loss of 12 per cent. Brookfield lost in the same period 16 per cent. The annual death-rate per 1,000 of population during the period 1886-1900 was in Plainfield, 15.4; in Brookfield, 15.5. The average age of death from all causes of death during this period was in Plainfield, 55.1 years; in Brookfield, 54.4 years—almost identical. It is apparent, therefore, that so far as longevity is concerned in the influencing the cancer mortality there is no essential difference between the two towns. As to the qualifications of the physicians as bearing on the amount of error in diagnosis in each place, *the physicians of the two towns are the same.* The two towns together constitute a single unit of territory in the practice of the physicians. One death certificate only out of 16 in Plainfield, in which cancer was assigned as the cause of death, was signed by a physician whose name did not also appear on death certificates of cancer cases in Brookfield. It is therefore plain that whatever degree of error in diagnosis entered as a factor into the cancer mortality of Plainfield must have effected equally the cancer mortality of Brookfield.

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*Plainfield is not one of the specified localities for which separate mortality statistics are given in the Monthly Bulletin of the New York State Board of Health. I therefore was compelled, in order to obtain the required date, to go through the official register of deaths in the town clerk's office and extract therefrom the facts that I needed. In the deaths from cancer accepted by me I included only such as would have been assigned to cancer as the cause by the State Board of Health. The cancer mortality of Plainfield thus determined may therefore properly be compared with that of Brookfield.

Having thus demonstrated the proposition that the towns of Brookfield and Plainfield are exactly similar in respect to the influence of both longevity and error of diagnosis on the assigned cancer mortality of each place, I shall now proceed to compare their respective cancer mortalities in order to determine the excess of the Brookfield cancer mortality over and above that of Plainfield, and thus the exact portion of the Brookfield cancer mortality that must be assigned to causes other than longevity and excessive error in diagnosis combined.

The per cent of cancer deaths to total deaths over the age of 30 years in Brookfield was found to be 12.61 (70 in 555); the corresponding per cent for Plainfield I found to be 8.64 (16 in 185). If two of the 16 deaths from cancer in Plainfield be excluded from consideration for the purpose of this calculation because these two cases only among the 16 had a history of cancer in other members of their respective families, the per cent of cancer deaths to total deaths over 30 years of age in Plainfield is reduced from 8.64 to 7.56. I have excluded these two cases from present consideration in order to exclude from the Plainfield figures any influence of heredity, for reasons that will be appreciated when we come to the question of heredity as a factor determining the development of cancer in families with a cancer history. Comparing then these percentages for Brookfield and Plainfield, we have the ratio: 7.56 : 12.61 : : 1.00 : x (= 1.667).* The Brookfield cancer mortality is thus found to be 1.667 times that of Plainfield, after allowing in each for the combined influence of both longevity and excessive error in diagnosis; i. e., the Brookfield cancer mortality (70 cases) is 1.667 times the cancer mortality assignable to the combined influence of longevity and excessive error in diagnosis. Hence the following equations:

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*This ratio and the deductions therefrom depend on the assumption that the entire Plainfield cancer mortality, except the two cases with a family history of cancer, is explained by the two factors, longevity and excessive error in diagnosis. Heredity, as an influence, has been excluded, so far as possible, for I made exhaustive inquiry into the family histories of all the cases and obtained a positive history of cancer in only two of the

$$1.667 : 1.000 : : 70 : x \ (= 41.9 \text{ cases})$$
$$1.667 : 0.667 : : 70 : x \ (= 28.0 \text{ cases})$$

Therefore, 41.9 out of the entire 70 cases of cancer in Brookfield can be accounted for by longevity and excessive error in diagnosis. As 33.5 cases were determined as the number due to the influence of longevity alone, therefore 8.4 cases may be assigned to excessive error in diagnosis over and above the average error in the State of New York as a whole. There remain at least 28 cases not due to these factors and therefore to be accounted for by other influences.

What factors, other than longevity and error in diagnosis, have operated to produce the excess of cancer mortality in Brookfield?—Heredity and consanguinity.—In answering this question I realize that I have the most difficult part of my task to perform, in which I may not expect that my own conclusions will meet with the approval and acceptance of all. I must therefore ask the indulgence of those who disagree with me when I assert my own belief that heredity and consanguinity are the special factors that have operated with peculiar force in Brookfield to produce the excess of cancer mortality over that attributable to the factors already considered.

The truth of the assumption of a direct influence of heredity in determining the development of cancer in families can be neither absolutely proved nor disproved in the present state of our knowledge. It is conceivable that multiple cases of cancer in a family may be the result of (1) hereditary predisposition, (2) longevity, by which the various members of a family live to the cancer period of

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16 cases, and these two cases I rejected in making the calculations. I believe, therefore, that the assumption made is close to the truth. However this may be, we have at any rate given to excessive error in diagnosis the maximal credit possibly due to it as a factor. Therefore, the 28 Brookfield cases is the minimum attributable to factors other than longevity and excessive error in diagnosis.

life, (3) mere chance* (4) infection with a hypothetical parasite, (5) other unknown etiological factors, or (6) any combination of two or more of these several elements. I shall not in this place engage in the controversy that is now waging over the etiology of cancer. The opinion held by each on the chief question involved in this controversy will naturally influence his answer to the question whether any part of the Brookfield cancer mortality may have depended on the influence of heredity. I would have no bone of contention to pick with anyone were he to attribute to this factor no part whatever of the excess of cancer mortality in Brookfield. For my own part I have no hesitation in asserting my belief in the reality of a heredity influence in determining the development of cancer in certain families. Holding this view, then, I should attribute to the influence of hereditary predisposition to cancer the excess of cancer in Brookfield that is not otherwise explained, because, as will be seen directly, a family history of cancer was a most prominent and noteworthy feature in a large part of the Brookfield cancer cases, and because no other special cause could be found to explain the local excess of cancer in Brookfield.

In order that full justice be done to the divergent views of etiology, I may add that the acceptance of heredity as a factor in cancer mortality does not necessarily commit one against the parasitic theory, for it is conceivable that hereditary predisposition to cancer may be simply hereditary susceptibility to infection with a hypothetical cancer parasite according to the analogy of certain other diseases. On the other hand, heredity may represent a congenitally transmitted tendency to a special cell proliferation—i. e., cancer—independent of any special infection. The ultimate explanation of heredity in cancer production may therefore be considered an open question.

The relation of family history of cancer to certain of the Brookfield cases of cancer is shown in Table VI. This table includes only such of the Brookfield cases in which it was practicable in the short

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*For an able discussion of the possible bearing of chance on the occurrence of several cases of cancer in one family, see King, quoted in Newsholme's *Vital Statistics*, 3d edition, pp. 248-249.

time at my disposal to work out family histories and genealogies to a certain extent in the first and sometimes the second and third generations. I do not assume to exclude in many of the cases not mentioned in this table similar relations, for I was limited in time and opportunity to about two weeks' study, and in this time I had much more than such relations to investigate. Twenty-seven of the 70 Brookfield cases of cancer are included in this table. Of the remaining 43 cases not included, in many no special inquiry was made; in others the information obtained as to family history of cancer, multiple cases in one house, etc., was either indifferent or negative (denying such relations). It is apparent, therefore, that the relations shown for the cases mentioned in the table may not logically be assumed to hold for the larger number of cases not thus mentioned. Nor would I give the impression that the facts noted in Table VI in regard to the Brookfield cancer cases therein mentioned are in any sense complete or exhaustive of the subject. They represent simply the facts that I succeeded in obtaining in a somewhat cursory and hurried investigation. For much of this information I am indebted to Dr. H. Clift Brown of Brookfield, whose courteous and generous assistance I take pleasure in acknowledging. I am also indebted for material assistance to Dr. O. L. Southworth of Plainfield, Dr. O. W. Burhyte of Brookfield, and Dr. C. H. Chesebro of Unadilla Forks.

Twenty-seven of the entire 70 Brookfield cancer cases (38.5 per cent.) are included in Table V. *Of these 27 cases, 23 show a history of cancer in other closely related members of their families, and only four fail to show other family cases.* In one family, for a marked example, no fewer than seven cases of cancer occurred in three generations, four of them being in a single generation, and all the seven victims, except two, living and dying in different towns. One can hardly fail to be impressed by the figures cited and even more by a perusal of the table of facts from which these figures are summarized. To some it may seem no mere coincidence that 23 cases are cited in which a family history of cancer was demonstrated, and that only 28 of the Brookfield cancer cases were left to be accounted for by factors other than longevity and error in diagnosis.

These numbers are very nearly equal, and the equality might be even more exact were the family histories of the other Brookfield cancer cases known. I therefore submit to the judgment of those interested the decision of the question whether heredity really is the factor that determined the excess of 28 cases in the cancer mortality of Brookfield over and above the possibility of explaining by reference to longevity and error in diagnosis.

Consanguinity, with reference to heredity, must be taken into account in Brookfield. For not only has there been no infusion of new blood in the people of this small country town, but a considerable portion of the population has for generations belonged to a strict religious sect known as *Seventh Day Adventists,* among whom there has undoubtedly occurred much inbreeding as evidenced by the names of parents in the death certificates and by information gleaned by conversation with the people.

Before dismissing the subject of heredity and consanguinity, I wish to state a few further facts in support of the view that these factors are the real cause of the excess of cancer mortality in Brookfield. Compared with the neighboring country towns, which resemble Brookfield in their general characteristics,* Brookfield stands preeminent in its cancer mortality, though all of these towns show an increased cancer mortality compared with the entire State of New York as a standard. The per cent of cancer deaths to all deaths for all ages was in the State of New York, 3.42 (1900); in Brookfield, 9.73 (1886-1900); in Plainfield,* east of Brookfield, 6.0 (1886-1900); in Bridgwater,* northeast of Brookfield, 5.1 (1888-1901); in Edmeston,* southeast of Brookfield, 5.1 (1887-1901); and in Hamilton,† west of Brookfield, 5.1 (1887-1900). The towns surrounding Brookfield are therefore fairly uniform in their cancer rate as opposed to Brookfield. In none of these towns was I able by personal investigation to find any pronounced predominance of a family history of cancer *within recent years.* I make this last qualification because in the adjoining towns of Plainfield and Edmeston I did obtain a pronounced family history of cancer in certain families living in a limited area of the town for many years ago; but such family cases had not occurred to any marked extent within the period of my investigation, 1886-1900. The sect of the Seventh Day Adventists was practically confined to Brookfield.

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*"Clubfoot disease" in plants prevailed equally in Brookfield and the surrounding towns.

†In Plainfield, Edmeston and Bridgewater, towns not specified in the Monthly Bulletin of the State Board of Health, I obtained the rates by a personal investigation of the registers of death. The rate for Hamilton is calculated from the statistics of the Monthly Bulletin.

"Cancer houses."—I was able to obtain a history of two or more cases of cancer occurring in each of nine houses in Brookfield. Such houses have been called by writers "cancer houses," and have been cited in corroboration of the theory of a parasitic origin or etiology of cancer, on the ground that they represented instances of local infection. An analysis of the facts presented in Table VI shows that, of the nine "cancer houses," in only four were the multiple cases occurring therein non-related by blood, and of these four in only one instance was there an absence of a family history of cancer in the immediate family for at least one member of the group in the same house. These facts are better shown by Table VII, adapted from Table VI, and support still further a belief in the influence of heredity.

"Cancer foci."—I was able to discover no special locations or spots of concentration of cancer in Brookfield, unless the houses with multiple cases be so regarded.

Husband and wife cases.—With reference to this interesting relation of cancer, four instances were noted. In two the husband and wife lived together and died in the same house; in two they lived together during married life and died in different houses. In the former two instances the intervals separating the deaths of husband and wife were two and five years; in the latter two instances, three and eight years respectively. Of these four couples a family history of cancer in the immediate family for at least one member of the couple was absent in only one case; in one instance there was a family history of cancer for each member of the couple, and in two instances for one member only. There were no instances of cancer of the genitals among these cases.

Conclusions.—From the foregoing considerations I have reached the following conclusions: Brookfield is credited with a remarkably high cancer mortality in the official statistics of the New York State Board of Health. An analysis of the cases shows that a considerable portion of the excess is explained by the two factors, longevity and error in diagnosis, and the remainder is probably due to the marked influence of heredity and consanguinity.

TABLE I.—*Anatomical Location of Cancer, by Sex, in Brookfield Cases for Period,* 1886-1900.

			Males.	Females.	Persons.
External		Face	2	....	2
		Nose	1	....	1
		Hand	1	....	1
		Axilla	......	1	1
		"Skin"	......	1	1
Sex organs and breast	Male	Penis	1	....	1
		Prostate	2	....	2
	Female	Uterus	......	10	10
		Ovary	......	1	1
		Breast	......	8	8
Alimentary canal and accessory organs	Upper	Mouth	......	1	1
		Jaw	2	....	2
		Larynx	......	2	2
	Abdomen	Stomach	16	17	33
		Liver	5	3	8
		Intestine	4	3	7
		Abdomen	1	2	3
Total			35	49	84

TABLE II.—*Age Distribution of Deaths from All Causes and of Deaths from Cancer in Brookfield, Period,* 1886-1900.

	All ages.	4.	5–9.	10–14.	15–19.	20–24.	25–29.	30–34.	35–39.	40–44.
Total deaths	719	80	10	13	22	13	24	21	24	20
Cancer deaths	84	0	0	0	0	0	0	3	5	6

	45–49.	50–54.	55–59.	60–64.	65–69.	70–74.	75–79.	80–84.	85–89.	90–94.	95–99.	Unknown.
Total deaths	24	28	22	63	64	79	72	80	41	14	3	2
Cancer deaths	5	4	9	8	17	10	7	6	3	1	0	0

TABLE III.—*Per Cent* of Deaths from All Causes and of Deaths from Cancer in Different Age Periods for Brookfield for Period,* 1886-1900, *and for the United States Census Registration Area, for* 1900.

	AGE PERIOD.						
	1-19.	20-24.	25-34.	35-44.	45-54.	55-64.	65 and over.
Total deaths:							
Brookfield	17	1	6	6	7	11	49
United States census registration area	37	4	9	9	8	9	21
Cancer deaths:							
Brookfield	0	0	3	14	10	20	52
United States census registration area	0	0	3	12	22	26	33

* Percentages expressed in whole numbers, fractions omitted.

TABLE IV.—*Per Cent of Cancer Deaths to Total Deaths at Different Age Periods.*

PLACE.	Time.	All ages.	All ages over 30.	30-39.	40-49.	50-59.	60-69.	70-79.	80 and over.
New York State *a*	1900.	3.42	6.04	2.7	6.8	8.8	8.3	5.4	2.6
United States census registration area. *a*	1900.	3.45	6.17	2.8	7.1	9.3	8.1	5.4	2.8
New England States *b*	1895.	3.53	6.25	3.09	6.14	9.77	8.36	5.52	2.79
Brookfield, 70 cases. *c*	1886-1900.	9.73	12.61	......	......	......	......	......	......
Brookfield, 84 cases. *a*	1886-1900.	11.68	15.13	17.7	25.0	26.0	19.6	11.2	7.2

a Figures compiled from the United States census.

b Figures obtained from "Statistics of Cancer in Massachusetts" by W. F. Whitney, M. D., published in the Thirty-second Annual Report of the State Board of Health of Massachusetts.

c Figures based on the 70 cases of cancer, as given in the Monthly Bulletin of the New York State Board of Health.

d Figures based on the 84 cases of cancer, as determined by my personal investigation.

TABLE V.—*Per cent of Cancer Deaths to Total Deaths, for All Ages and for All Ages over 30, for Brookfield Compared with New York State, United States Census Registration Area and New England States, with Ratios.*

	Brookfield.[a]	New York State.[b]	Brookfield.[a]	United States census registration area.[b]	Brookfield.[a]	New England States.[c]
All ages.	9.73:3.42.	Ratio, 2.84:1.00	9.73:3.45.	Ratio, 2.82:1.00	9.73:3.53.	Ratio, 2.75:1.00
All ages over 30	12.61:6.04.	Ratio, 2.08:1.00	12.61:6.17.	Ratio, 2.04:1.00	12.61:6.25.	Ratio, 2.01:1.00

[a] Percentages based on 70 cases of cancer in period, 1886–1900, as given by the Monthly Bulletin of the New York State Board of Health.
[b] Percentages based on United States census for census year 1900.
[c] Percentages obtained from "Statistics of Cancer in Massachusetts," *loc. cit.*

TABLE VI.—*Certain Groups of Cancer Cases—Family Groups, "Cancer House" Groups, Husband and Wife Groups, Etc.**

GROUP I.

Year of death.	NAME.	Age.	Organ.	Relationship.				Remarks.
1848..	Mrs. E. G	80	Hand	Mother.				
1850[1].	Mr. H. G	65	Face	Children.	Brother.	......	......	Two, same house.
1871[2].	Mrs. L. G. B.	80	Mouth		Sister.	......	......	
1872[3].	Mrs. N. G. W.	70	Stomach		Sister.	......	......	
1882..	Mrs. S. G. B.	88	Face		Sister.	Mother.	......	
1891[4].	Mr. A. B.	73	Face	......	......	Sons.	Brother.	
1892*a*.	Mr. M. E. B.	70	Stomach				Brother.	

[1] Lived in Utica, N. Y.
[2] Lived in Wisconsin.
[3] Lived in Utica, N. Y.
[4] Lived in Hamilton, N. Y.

GROUP II.

Year of death.	NAME.	Age.	Organ.	Relationship.				Remarks.
1888*a*.	Mrs. P. S.	74	Axilla	Wife	......	......	......	Three, same house.
1893*a*.	Mr. P. S.	76	Stomach	Husband	Brother	......	......	
1884..	Mrs. M. J.	57	Stomach	......	Sister	......	......	
1898*a*[1]	Mr. W. S.	68	Stomach	......	Brother	......	......	Two, same house.[1]
1900*a*[1]	Mrs. H. S.	67	Stomach	......	......	Niece	......	
1891*a*.	Miss P. L.	72	Mouth	......	......	Aunt.		

[1] Mr. W. S. developed cancer in a certain house, but moved out of this house and died elsewhere one year later. Mrs. H. S. moved into this house directly after the death of Mr. W. S.; developed cancer in a few months and died in the house within eighteen months.

GROUP III.

Year of death.	NAME.	Age.	Organ.	Relationship.				Remarks.
1850[1].	Mr. J. H.	80	Face	Father.				
1850[2].	Mr. J. H., Jr.	60	Stomach	Children.	Brother.			
1880[1].	Mr. I. H.	77	Face		Brother.			
1885[1].	Miss E. H.	86	Stomach		Sister.			
1892*a*.	Mr. G. W. H.	84	Stomach		Brother.			

[1] All three lived in different houses in Plainfield, N. Y.
[2] Died in Smyrna, N. Y.; developed cancer in Plainfield in a different house from the others.

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* Each case that is included in the summary of 70 cases, for Brookfield, for the period, 1886–1900, is marked *a*. All cases, not marked to the contrary, died in different houses.

GROUP IV.

Year of death.	NAME.	Age.	Organ.	Relationship.				Remarks.
1886*a*.	Mrs. S. N. A...	84	Stomach	Mother .				
1897*a*.	Mrs. H. M. C..	69	Stomach	Daug'ter	Wife.			
1894*a*.	Mr. H. M. C...	66	Stomach	....	Husband..	Brother.		
1896*a*.	Mr. J. A. C....	60	Stomach	....	....	Brother.		

GROUP V.

Year of death.	NAME.	Age.	Organ.	Relationship.				Remarks.
1885..	Mrs. L. E. C...	66	Uterus .	Sister ..	....	....	......	Three, same house.
1897*a*.	Mrs. L. E. B...	66	Stomach	Sister ..	....	....	......	
Living	Miss T. E......	..	Breast ..	Sister ..	....	....	......	
....[1]	Mrs. E. C......	..	Colon ..	Sister.				

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[1] Lived in North Litchfield, N. Y.

GROUP VI.

Year of death.	NAME.	Age.	Organ.	Relationship.				Remarks.
1900*a*.	Mrs. S. F. B....	78	Liver...	Sister...	....	....	......	Two, same house.
1890*a*.	Mr. P. F........	84	Face ...	Brother.	Father....	....	......	
1901[1].	Dr. A. D. F....	..	Lip	....	Son.			

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[1] Had cancer of lip removed in 1891; died subsequently of apoplexy.

GROUP VII.

Year of death.	NAME.	Age.	Organ.	Relationship.				Remarks.
.....[1]	Mrs. W. M.....	..	Breast..	Sister...	Aunts.			
.....[2]	Mrs. W. T	..	Uterus..	Sister...				
1897*a*.	Mrs. A. T. M...	49	Breast ..	....	Niece.			

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[1] Lived in Madison, N. Y.
[2] Lived in Sangerfield, N. Y.

GROUP VIII.

Year of death.	NAME.	Age.	Organ.	Relationship.				Remarks.
.....[1]	Mr. A	..	....	Father				
.....[1]	Mr. A	..	....	Sons	Brother.			
1887*a*.	Mr. B. J. A.	53	Stomach		Brother.			

[1] Did not live in Brookfield.

GROUP IX.

Year of death.	NAME.	Age.	Organ.	Relationship.				Remarks.
1866..	Mr. R. C	56	Lip	Father..	....	....	......	Two, same house.
1895*a*[1]	Mrs. F. C. P	54	Stomach	Daug'ter	....	....	......	

[1] Lived with her father until his death; subsequently lived eighteen years in Vermont; returned to her father's house in Brookfield in 1804 and within five months developed cancer.

GROUP X.

Year of death.	NAME.	Age.	Organ.	Relationship.				Remarks.
1879..	Mrs. C	..	Uterus .	Mother ...	....	....	......	Two, same house.
1899*a*.	Mrs. M. C. B...	59	Uterus .	Daughter .	....	....	......	

GROUP XI.

Year of death.	NAME.	Age.	Organ.	Relationship.				Remarks.
1894*a*[1]	Mrs. M. I. B...	35	Stomach	Wife	....	....	......	Two, same house.[2]
1896*a*.	Mr. M. I. B ...	43	Stomach	Husband .	....	....	......	

[1] There was a family history of cancer in Mrs. B's family.
[2] The house was new in 1889.

GROUP XII.

Year of death.	NAME.	Age.	Organ.	Relationship.				Remarks.
1892*a*	Mr. P. W	63	Stomach	Not related	....	....	......	Two, same house.
1894[1].	Mr. H.........	..	Stomach	....	....	....	......	

[1] Mr. H. took Mr. W.'s blacksmith shop immediately after the latter's death and developed cancer within one year. He left Brookfield and died elsewhere. Nothing known of family history of either.

GROUP XIII.

Year of death.	NAME.	Age.	Organ.	Relationship.				Remarks.
.... [1]	Mr. G. C......	..	Lip	Brother.				
1899*a*.	Mrs. R. C. R...	80	Stomach	Sister.				

[1] Lived in another county in New York. He had cancer of the lip removed in 1890 and died subsequently from another cause.

GROUP XIV.

Year of death.	NAME.	Age.	Organ.	Relationship.				Remarks.
1888*a*.	Mr. A. A. B....	69	Stomach	Brother.				
1889[1].	Mrs. J. B. S....	..	Stomach	Sister.				

[1] Lived in Columbus, N. Y.

GROUP XV.

Year of death.	NAME.	Age.	Organ.	Relationship.				Remarks.
1889*a*.	Mr. J. A. S.....	69	Face ...	Husba'd				
1897*a*[1]	Mrs. J. A. S....	67	Ovary ..	Wife ...				

[1] After husband's death, moved to another house.

GROUP XVI.

Year of death.	NAME.	Age.	Organ.	Relationship.	Remarks.
1899*a*.	Mr. T. P.......	77	Liver ..	Brother.	
1899*a*.	Mr. J. P.......	85	Hand ..	Brother.	

TABLE VII.—*Cancer Houses—Multiple Cases of Cancer Occurring in the Same Houses in Brookfield, Classified with Reference to Consanguinity and to Family History of Cancer.*

- "Cancer Houses". 9
  - Two cancer cases each.. 7
    - Cases related by blood............ 4
    - Cases not related by blood........ 3
      - Family history cancer, both sides.......... 1
      - Family history cancer, one side only....... 1
      - No family history cancer 1
  - Three cancer cases each.. 2
    - All three related by blood........ 1
    - Two related by blood, the third not related...... 1

February 1, 1903.

A CANCER DISTRICT IN THE TOWNS OF PLAINFIELD AND EDMESTON, NEW YORK.

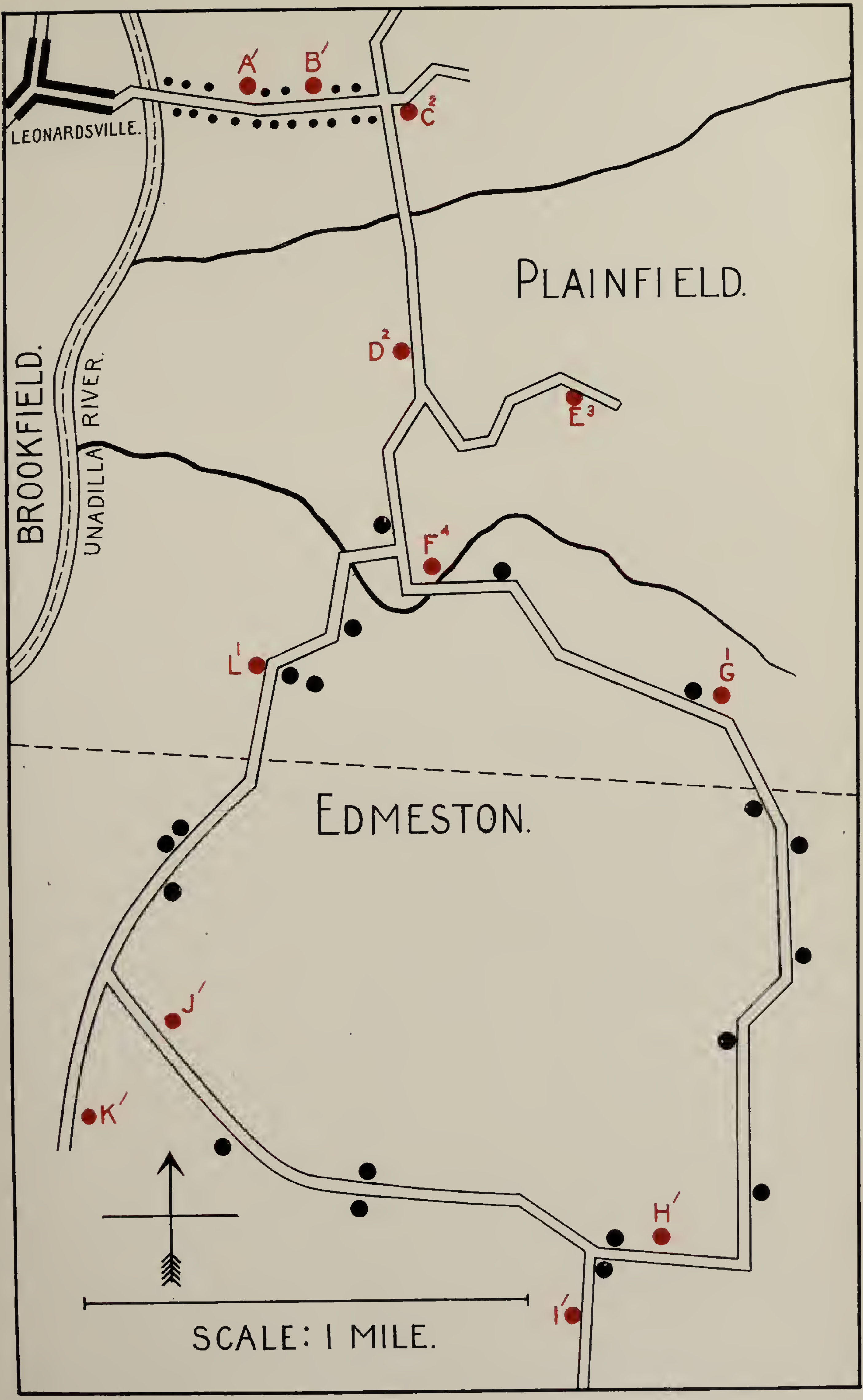
By Irving Phillips Lyon, M. D.

While engaged in studying the cancer distribution in the town of Brookfield, my attention was drawn by certain physicians to the fact that quite a cancer focus had previously existed just across the town line of Brookfield in the towns of Plainfield and Edmeston, Otsego county, and in consequence I made an investigation of the subject on the spot.

The area embraced in this cancer district is about 2.5 x 1.5 miles, in a rough, hilly farming country. The accompanying road map shows the location of every house in this district, indicated by black dots for houses in which no cases of cancer have occurred within the recollection of the older physicians and inhabitants, and by red dots for cancer houses. Each cancer house is further marked on the map for the number of cancer cases known to have developed in it, and is given a letter for the purpose of reference.

It will be seen that this map shows twelve cancer houses, including nineteen cases of cancer, in the limited territory represented—a much greater number than known in other districts of similar size and population in the neighboring country. The dates of death of these cases (Table I) indicate that cancer occurred more frequently years ago than recently. Thus 10 of the nineteen cases were before 1875 and 15 before 1885, only four having occurred in the period 1885-1900. It will be noticed also that the ages at death were generally quite advanced.

I made a rather careful inquiry into the family histories of the persons who had developed cancer in these houses and found, as given in detail in Table I, only four cases among the nineteen that failed to have a positive history of cancer in other members of their


LEONARDSVILLE.
A¹
B¹
C²
PLAINFIELD.
D²
E³
BROOKFIELD.
UNADILLA RIVER.
F⁴
L¹
G¹
EDMESTON.
J¹
K¹
H¹
I¹
SCALE: 1 MILE.

[illegible]
[illegible]
[illegible]

families, and of three of these four cases little or nothing as to family history could be ascertained. In view therefore of the great preponderance of a further family history of cancer among these cancer-house cases, I am of the opinion that *this cancer district represents a concentration of cancer families rather than cancer houses.* For the benefit of those who deny the influence of heredity in determining the development of cancer in families, I would make the same reservations and suggestions indicated in the preceding report on the cancer mortality of Brookfield.

In conclusion I desire to acknowledge my indebtedness to Dr. O. L. Southworth of Plainfield for much assistance in working out the details of this cancer district.

TABLE I.—*Relation Between Cancer Cases in "Cancer Houses," Consanguinity and Family History of Cancer.*

Year of death.	NAME.	Age.	Organ.	House.	Relationship.				Remarks.
1868	Mr. S. D	70	Stomach	E	Husband	Brother	Uncles	Granduncles.	
1869	Mrs. S. D	68	Stomach	E	Wife.				
1884	Mr. J. D	91	Stomach	L	....	Brother			
1882	Mrs. S. D. T.	55	Stomach	H	Cousin	....	Nieces.		
1887	Mrs. H. E. McI.	53	Abdomen	..	Cousin	....			
1891	Mrs. S. D	55	Breast	J	Mother.				
1899	Dr. E. D	40	Face	Another town	Son	....	....	Grandnep'w.	
1884	Mrs. J. T.	77	Breast	E	Not related	....	....	....	No family history of cancer.
1850	Mr. J. H., Sr.	80	Face	G	Father.				
1870	Mr. J. H., Jr.	60	Stomach	D	Children.	....	....	....	Developed cancer in Plainfield, died in Smyrna, N. Y.
1880	Mr. I. H	77	Face	..					
1885	Miss E. H	86	Stomach	..					
1892	Mr. G. W. H	84	Stomach	Brookfield					
1861	Mr. W	85	Face	F	Husband	Parents.			
1870	Mrs. W	95	Uterus	F	Wife				
1873	Mr. J. B. W	80	Stomach	F	....	Children.			
1892	Miss S. W	85	Face	F	....				
1862	Mr. H. C.	Old	Stomach	D	Father.				
1890	Mr. G. C.	68	Lip	Another town	Children.				
1899	Mrs. R. C. R.	80	Stomach	Brookfield					

1855	Mr. S. W.	60	....	....	Father.				Father and son lived one mile apart; cousins' fathers were brothers.
1896	Mr. H. J. W.	66	Stomach	B	Son	Cousin.			
1889	Mrs. L. A. C.	47	Stomach	....	....	Cousin.			
1835	Mr. J. C.	64	Rectum	C	Father.				Mr. J. C. and Mrs. C. H. C. W. died in different houses built on exactly the same spot.
1877	Mr. F. C.	61	Stomach	A	Children.				
1884	Mrs. C. H. C.	75	Uterus	C					
1860	Mrs. D. W.	50	Stomach	K	Sister.				
1868	Mrs. H. W.	65	Breast	Brookfield	Sister.				
1895	Mrs. I. T.	74	Uterus	I					Family history of cancer.

February 1, 1903.

A REPORT UPON THE PHYSICS AND THERAPEUTIC VALUE OF KATHODE AND ULTRA-VIOLET RAYS, WITH REFERENCES TO THE ELECTRO-MAGNETIC THEORY OF LIGHT.

An Attempt to More Clearly Define the General Character of These Recently Introduced Agents in the Treatment of Cancer.

By Roswell Park, M. D., LL. D.

Within the past eighteen months there has been such general interest aroused in the treatment of certain cancerous and other infectious diseases by kathode and ultra-violet rays, and so many have been induced to experiment therewith that it has seemed to me wise to study more carefully the nature of these agents in order that we may more fully comprehend their physical characteristics before employing them too indiscriminately.

It is very certain that but a small proportion of the physicians who are purchasing more or less expensive appliances, to whose uncertain effects they are subjecting their patients empirically and often rashly, have an adequate comprehension of what they are doing or how doing it. This report is a brief epitome then of recent researches into the physics of certain widespread or universal phenomena with which, it seems to the writer, all should be acquainted who purpose taking up and practising the so-called X-ray or Finsen light treatment of cancer. It is not intended to present here directions for their use, nor to report cases, though to give it a certain " practical " character a few conclusions are appended. *It is too early yet to report cases.* Considerable time must yet elapse before we can speak with certainty as to the actual value of these new methods. Meantime, while waiting for these results, we can accumulate experience and we can broaden our acquaintance with the agents to which we are resorting. It is hoped that this report will be of assistance in this direction. The subject is approached, as will be seen, with this purpose distinctly in view.

Periodically in the history of events, and in the advance which science is constantly making, it has become necessary to not only stop and as it were take account of stock, but to entirely revise present notions; sometimes in accord with entirely newly discovered facts, at other times in accord with older and perhaps abandoned views. This is true at the present time with regard to the most elementary notions concerning the physical character of light and electricity.

The primary concepts of science have included the existence of matter in an incomprehensibly minute division, each tiny particle being spoken of as an atom. Some such concept was absolutely necessary for purpose of measurement and calculation and as a basis upon which to build a superstructure. While no one ever has seen, and probably no one ever will see an atom, nevertheless the existence of atoms has been universally conceded by all scientists as a necessary postulate of thought and computation. Scientists have even gone so far as to calculate the size of the atoms, and Lord Kelvin figures the average atom as one twenty-five millionth of an inch in diameter. This is not merely the scientific use of the imagination, as Tyndall used to say, but is based upon calculations which have very much to support them and practically nothing to weaken them save the lack of power of our finite minds to comprehend the infinitely small. But the existence of atoms of this size as a postulate of physical science does not supply the demands now made upon it, and of late men have been seeking a demonstration of the existence of particles still smaller by whose activity and ceaseless energy certain natural phenomena may be explained. Both the size and the activity of these ultimate particles transcends the limits of our imagination, yet they are necessary adjuncts to such conceptions of them as we can form. The ordinary conception of an atom has been that in one cubic centimeter of gas there are twenty million, million, million

($2x10^{10}$) molecules. This was Loschmidt's estimate, and it has been confirmed independently in several ways, among others by the electrolytic method and by Lord Rayleigh's calculations concerning the opacity of the air.

The researches of Prof. J. J. Thompson, assisted by those of Sir George Stokes and Professor Townsend, have now apparently established the existence of particles not larger than one-thousandth of the diameter of the atom whose size has just been stated, each of which is capable of carrying a tiny charge of negative or positive electricity; those carrying negative charges being those which most interest us here. It is a stream of these proceeding from the kathode which causes the Roentgen ray, instead of light rays vibrating in a lateral instead of a longitudinal direction, as was at first held. It will be seen that this is not far from accepting Crooke's fourth or radiant state of matter. The greenish phosphorescence of a Crooke's tube is due to the bombardment of the attenuated gas which it still contains by this stream of particles, which are now usually spoken of as *corpuscles*. Although it was at first held that this stream could not be deflected nor reflected, it is nevertheless true that it may be, at least in part, deflected by an electrostatic or magnetic field, if only the vacuum be high enough.

These corpuscles are also given off by incandescent metal, by cold metal when illuminated by the ultra-violet ray, and by radium. Everywhere when pressure of gas is relatively low, i. e., when there is a vacuum, and when the corpuscles find few atoms to which to adhere and give up their electric charges, it is found that they are the carriers of negative electricity.

Thompson has recently shown (Popular Science Monthly, August 19, 1901) that there is a remarkable difference between negative and positive electricity, for the latter instead of being associated with a constant mass (i. e. corpuscles) one-thousandth the size of a hydrogen atom, is connected with a mass of the same order as an ordinary molecule, varying of course with the gas in which electrification takes place. That is, the carriers of negative electricity are infinitesimally minute and invariable, while all the positive masses are larger and quite variable. This naturally suggests a view that these corpuscles themselves, or ions, constitute negative electricity and that positive electricity simply implies their absence from ordinary atoms. This takes us back to the old Franklinic view, that electricity comprised a fluid, and makes us think that in using the term electric fluid they were wiser than they knew, and that changes in the state of electrification are due to transportation from one place to another. It seems to be established that a body negatively electrified has its volume augmented, while positive electrification involving absence of corpuscles is accompanied by diminution of volume. Thus a charged body by virtue of its charge possesses proper mass apart from the ordinary matter composing it. All of which Thompson showed twenty years ago.

These corpuscles are not the atoms of a metal but infinitely smaller bodies which are the same for all substances. Their failure to escape from a metal, or from the surrounding air or medium, is due to the fact that negative corpuscles are attracted by positive atoms, even by neutral, hence the fact that metals, especially some of them, are such great conductors. Under the influence of great heat or of the ultra-violet rays, the corpuscles seem to acquire enough energy to escape. Radium constitutes an exception to this statement since emanation or escape from it takes place as rapidly as 2×10^{10} times per second, or two-thirds as rapidly as light moves, while they have a very much more penetrating power. Since gas becomes a conductor when the corpuscles pass through it, but not when its pressure is reduced, we have an explanation of electrical phenomena occuring in our upper atmosphere, especially when its density and movements are controlled by such currents as are known to occur. Variations in the earth's magnetic field, and consequently in the compass, may thus be explained. The conception and acceptance of those views about corpuscles, which I have just summarized, have necessitated a complete revision of previous opinions. These corpuscles, considered to be not larger than one-thousandth of the size of hydrogen atoms, each bearing its charge of negative electricity, are known to be discharged with tremendous velocity:

1. From the negative electrode in a Crooke's tube, kathode rays.
2. From objects impinged upon by these kathode rays (X-rays).

3. From exceedingly hot bodies such as incandescent metals.
4. From cold metals under the influence of the ultra-violet rays.
5. From the radio-active substance or element radium.

These corpuscles, or ions, passing through a gas produce other ions by collision with its molecules. These ions also with their peculiar electric properties serve as nuclei for the condensation of ordinary matter. It has been the particular service which the great Sweedish physicist Arrhenius has rendered, that he has introduced this conception of the electro-magnetic properties of these ions into the theory of light, and has shown that while the ordinary properties of light may be considered as still amenable to the so-called laws under which they have so long been studied and classified, there still needs to be introduced into the subject this entirely new feature by which, along with the wave motion to which we have been so long accustomed, certain other physical features must be added.

Kepler and Newton, who regarded light as a corpuscular emanation, would perhaps appear to have considered it more wisely than they then realized. The hypothesis which they built up was superseded by the wave theory of Huygen's, upon which until very recently all optical calculations were made. It does not disturb the practical value of these calculations if we assume that there is actual projection of matter in the direction of the light waves;—matter probably of this corpuscular and elementary character which has the power of permeating space and all other material out of which the elements are probably built up, and which travels with simply inconceivable rapidity.

Let us now step aside for a moment from the consideration of therapeutics to see how well these views of Arrhenius fit the various facts regarding the nature of certain universal phenomena, since if our primary concepts can be shown to be comprehensive and correct, it helps very much in limiting the field of inquiry to so relatively small a proportion as that of the therapeutic value of certain light rays. It is known that the surface of the sun evinces a wonderful repulsive force, which at least until now could never be satisfactorily accounted for. Aside from its heat-giving power, it is our principal source of emission of light. Until recently it had not been generally suspected that a ray of light could exert the faintest pressure, although Maxwell calculated in 1873 that sunlight at the earth's surface should exert a pressure of .6 x 10 to the minus tenth power in grams on every square centimeter (.592 x 10^{10}). Arrhenius, practically accepting this calculation, has shown that on the sun's surface this pressure amounts to 2.75 mg. for every square centimeter. If now one gram of water (i.e., 1 c.c.) weighing this amount at the earth's surface, could be carried to the sun's surface and weighed there; it would be found to weigh 27.5 grams; that is, the attraction of the sun would draw it in with 10,000 times the force with which the sun's light would tend to repulse it. But now if instead of a cubic centimeter, we consider a much smaller cube the pressure on its base would diminish as the square of its edge, but its weight would diminish as its cube or volume. Consequently there must come a point when the pressure of light would balance the weight of an exceedingly small particle and finally exceed it. That is, as Cox has described it, these particles would behave as if gravity had become negative or reversed. This limit in minute size is approximately reached with a cube whose edge is one mikron in length; that is, one-thousandth of one milimeter.

Here we face this apparent paradox, that providing particles are small enough the pressure of light may be a much more active factor in their activities than their weight. This will explain, for instance, the long time required for the settling of very small particles in the air, and thus we may account for the red sunsets which were noted for so many months following the eruption of Krakatoa.

But nothing will so illustrate the terrific pressure and repulsive force to which these particles may be subjected as the motions, and especially the curvatures, of comets' tails, where the repellant force equals or far exceeds the gravitational or attractional force of the sun. Arrhenius and Bredichin have gone even so far as to calculate the size of the particles in the tails of certain comets, basing their calculations on the hypothesis that as comets approach the sun its intense heat provokes a violent eruption of hydro-carbon vapors, especially on its exposed side; that as the hydrogen boils off the vapors condense into minute drops or particles, of which the larger may drop back while the smaller are driven off from the sun, forming the comets' tails which have been so often seen pointing away from it. They calculate also that particles thus driven may traverse a space equal to the sun's diameter (850,000 miles) in a few minutes. If this be true the formation of tails 120,000,000 million miles long within two days, as has been actually seen, is shown to be theoretically possible.*

Equally well are the phenomena of the corona and smaller prominences accounted for. The sun must project enormous quantities of vapor into space. If this vapor condenses into particles larger than the critical size above referred to (i. e. so that their weight prevents their projection by light) then they fall back toward the sun, giving rise to the prominences seen during total eclipses; if smaller they are driven into space to enormous distances, and appear as the streamers of the corona. Particles of just the critical size may float in clouds such as are also observed.

The zodiacal light may also be explained by the streams of electrically charged corpuscles which the sun emits, which by the time they reach the higher and rarified regions of his own atmosphere are practically Roentgen or kathode rays. If very hot metal emits these rays, as we know it does, there is every reason to think that the superheated sun's surface does the same. Those rays which are visible to us lie mostly in the plane of the ecliptic, and give rise to the peculiar evening glow in the west which we speak of as the zodiacal light. This will also explain that similar but very faint

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*At a recent meeting of the American Physical Society in Washington (Dec., 1902) Nichols and Hull described an experiment by which something greatly resembling a comet's tail was obtained under conditions approximating those of nature. A powder consisting of a mixture of emery and puff-ball spores was placed in a vacuum tube constructed somewhat like an hour-glass. The vacuum was made as perfect as could be obtained, precautions being also used to get rid of mercury vapor. Upon pouring the powder from one part of the tube to the other, and at the same time concentrating upon it the rays from an arc, the lighter portions of the powder were seen to be blown out as though repelled by the light, and presented an appearance quite similar to that of a comet's tail. The effect was of the same order of magnitude as would be expected from the author's values for light pressure.—*Science,* Jan. 30, 1903, p. 181.

appearance sometimes seen before the eastern sunrise which the Germans have significantly termed the "gegenschein."

No one can have watched the aurora without being struck by the similarity of its manifestations to those of the kathode rays in a Crooke's tube, especially when these latter are subjected to a magnetic field when they describe helices about the lines of force. The negative particles coming from the sun are scattered most thickly on the equatorial regions of the earth which are most exposed, but before they reach a level in our atmosphere dense enough to excite luminescence they are caught in the lines of force of the earth's great magnetic field and follow them. As these lines dip outward from the equatorial heights toward the surface, at our magnetic poles, they finally reach an elevation where the rarefaction is comparable with the vacuum of a Crooke's tube, and here they begin to give out the shifting, darting lines of enormous kathode rays. When they reach the denser layers of the air their energy is exhausted, hence the dark circles around the magnetic poles from which they seem to dart. The Swedish North Pole Expedition, by a large number of trigonometrical observations, established that the average distance above the ground of the base of the aurora is, at Spitzbergen, about 34 miles, at which height the pressure of the atmospheric nitrogen is about one-tenth of one millimeter. It has been also shown that at such pressures the rays of nitrogen and oxygen fade, while those of argon and the other light elements, helium, neon, krypton and xenon take their place. Furthermore, that electrical discharges traverse six or eight times as much space in helium and neon as in hydrogen or argon. This will also explain why the spectra of argon and neon are seen in the aurora much oftener than those of helium, krypton and xenon.*

Additional plausibility is given to this explanation by the relation now universally accepted between sun spots, auroræ and magnetic storms, which have a common variability.

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*Air contains by volume, at the earth's surface;
1% argon.
1 or 2 parts neon per 100,000.
1 or 2 parts helium per 1,000,000.
1 or 2 parts krypton per 1,000,000.
1 or 2 parts xenon per 20,000,000.

If kathode rays really occur in this way and to this magnificent extent, our aurora being occasionally visible evidence thereof, then the negative ions formed by ionization of the air will form centers for condensation, and falling to the earth will charge it negatively, leaving the air at moderate heights charged positively. If this be true then clouds should be more common in years when the aurora is more frequent, which is actually the case, since condensation will depend upon the number of ions available for nuclei. The ordinary phenomena of lightning are then to be interpreted as immense sparks taking place across this spark gap.

This theory is capable of further extension to cover the formation of meteorites and nebulæ. By the aggregation of those particles which miss the earth and the planets larger masses are formed, or by the union perhaps of these with similar streams proceeding from other suns. Thus are constructed masses of various size which obey gravitational impulses, or the attraction of other masses, and move in space in accordance with these governing impulses. Yet other particles escape the other suns and stars and help to form the gaseous nebulæ, for it is well known that there are certain nebulæ which are not resolved by any telescope and whose constituents are shown by the spectroscope to be gaseous. These exist in interstellar space at the temperature of absolute zero, at which molecular activity is almost or quite stilled and are not capable of shining by any property of their own. Only their outer borders shine because of their bombardment by these particles which give up their electric charges and cause the gases of the nebulæ to shine like those of a vacuum tube.

Such is a very brief résumé of the electro-magnetic theory of light as comprised in the fascinating and ingenious speculation of Arrhenius, as popularly set forth by Cox (Popular Science Monthly, January 19, 1902, p. 265), and may perhaps serve to give a little clearer notion as to the so-called corpuscular nature of both electricity and light.

We are now so accustomed to availing ourselves of that most interesting fact discovered by Roentgen only seven years ago—that the kathode rays of a Crooke's tube not only produce fluorescence of certain salts, but permeate many apparently solid objects while causing others to cast shadows—that we are inclined to forget how recent is this discovery, and how much it has meant to us. We are also likely to forget that Roentgen was but the last one of a group of men who had been studying the phenomena of electrical discharges in vacua. Crooke succeeded in producing higher vacua in sealed tubes than any of his predecessors, and he had reduced the pressure of the residual air in these tubes to about one ten-millionth of an atmosphere. He had shown also that at a certain stage of this exhaustion electric discharges from the kathode became visible, and had assumed that this was a projection of active matter shot off from the negative pole with a velocity which he figured at about 250,000 yards a second. Lenard in 1894 found that these rays traveled better in a vacuum than in air, that they would pass through substances opaque to ordinary light and affect a photographic plate. It was Roentgen's service to show that when the degree of vacuum was increased a variety of rays was given off which were more powerful than the Lenard rays, which seemed to be unaffected by the magnetic field, and that particularly those salts which are now used in the fluoroscope glowed under their influence.

The nature of the kathode rays is not now quite as mysterious as it was when they were first discovered. To more completely understand them we should refer to the ordinary spectrum thrown upon a screen when light passes through a prism. The more we extend our knowledge of this spectrum the better we appreciate that beyond the red end may be felt the heat waves, which are of longer wave length and which do not pass so easily through glass as does red light; thereby affording the reason for the use of a glass fire screen. Beyond these rays are others of still longer wave length which were carefully studied by Hertz and are often known as the Hertzian rays, which have the peculiar property of converting poor electrical contacts into good ones when they fall upon them. A demonstration of such effect may be made with powdered aluminum which ordinarily is a poor conductor, but which under the influence of Hertzian rays becomes a good one. These rays are supposed to have wave lengths even several miles in length, and they are the longest in this respect of any that have yet been discovered in the spectrum. Proceeding from this ultra red end toward the other end of the spectrum we find that wave lengths rapidly diminish, and when we come to those known as the ultra violet they are estimated as only one sixty-thousandth of an inch in length. These ultra-violet rays are also ordinarily invisible but can be demonstrated by their property of producing fluorescence in certain substances, for instance uranium glass, which under their influence shines with a greenish yellow light. They also affect the silver salts more speedily than do the visible rays of the spectrum.

Beyond the region of these actinic rays are others, called after Niewenglowski and Becquerel, who discovered them.

The phenomenon of phosphorescence is as yet one of nature's mysteries. It has long been known that calcium sulphide, which is the basis of luminous paint, shines in the dark,—but only after it has been exposed to sunlight; by such exposure it has acquired a property it loses after a time.

Niewenglowski was probably the first to establish the fact that from phosphorescent substances certain luminous rays are emitted which may pass through opaque screens and affect sensitive plates. He proved this with calcium sulphide which had been thus exposed to sunlight. It emitted rays which passed through an aluminum plate. But Niewenglowski's rays are due to the action of sunlight upon the material which he used and which later emits them. Without preceding sunlight there would be no rays of this character. And these rays are refracted by glass like ordinary light rays, this apparently showing that they are not made up of a stream of corpuscles as are the kathode rays. These rays were first studied by Becquerel and may be spoken of as Becquerel's rays; i. e., light rays of ordinary wave motion capable of penetrating certain opaque objects.

Becquerel very early conceived the idea of studying whether the property of emitting powerfully penetrating rays was not intimately bound up with phosphorescence. He proceeded empirically by placing various phosphorescent substances enveloped in opaque wrappings upon sensitive plates. In this way he discovered that a mineral containing the metal uranium left its marks upon the plate, and that it was not necessary that this material should be previously exposed to sunlight. By further ingenious experiments it was shown that uranium in metalic form, prepared in the electric furnace, gave out greater abundance of rays than did any of its compounds, and that this emission of rays was continuous and direct, even, so far as could be seen, never ceasing. The next step was to ascertain whether this property was due to uranium itself or to some other substance contained within it. A further study showed that the metal contained certain impurities, and further still that these impurities were composed of at least three distinct elements—radium, actinium and polonium. Uranium is prepared from pitchblende. From this mineral Professor Curie and his wife isolated a very small quantity of radium which they finally got in a nearly pure form of radium chloride, which has been shown to have a ray emitting power several hundred thousand times greater than uranium. If radium could be secured in pure form it would have a value of nearly $1,000 a grain. To-day in all the world there is less than a gram of pure radium chloride, and the other elements mentioned are mainly known by their spectra.

Becquerel rays then are these emitted by radium in some of its forms. Radium stands alone, so far as is at present known, in its powers in this direction. If a tube of its chloride be held to the forehead in the dark, with closed eye, the experimenter will still see light, since the retina itself becomes phosphorescent. It shines quite vividly by its own light. When applied in sealed tubes to the outside of the body it produces intense dermatitis, or even sloughing of the skin. It imparts its radio-activity to any substance placed in its neighborhood. Not only metal objects but the clothing, and even the bodies of exposed experimenters, give out rays capable of affecting photographic plates and discharging electroscopes.

It has been lately proposed to employ radium locally over superficial cancers, and to thus take advantage of its wonderful properties in influencing the disease process. But until it can be procured in some reliable or semireliable form this will be impossible. A gram, if it could be procured, would be worth at least $10,000 to-day, and there does not exist at present in all the laboratories of the world even so much of this precious substance.

Becquerel further experimented as to the effect of a magnet upon these rays. He has shown that some of them at least are deviable while others are not; that is, they really consist of two distinct kinds of radiation, one influenced, the other uninfluenced by the magnet. The former seem to be identical with the kathode rays of a Crooke's tube, while the latter are identical with those particularly described by Roentgen.

Perhaps the greatest mystery of all is the source of the ceaseless energy which radium emits. The answer will probably be found in those vibrations of ultimate matter which are transmitted throughout space, which as Duncan has said is all aquiver with the waves of radiant energy, ranging from the infinitely short to the incomprehensibly long, the rays which most interest us being exceedingly short, while the waves of great length, corresponding to the sound waves of the organ diapason, are the waves of Hertz and Marconi, equally mysterious but concerning us less at this time and place.

It is known that certain insects and small animals give off a peculiar radiation which much resembles the Niewenglowski rays, which will pass through aluminum and affect sensitive plates. Finally, still further along in the scale, we come to the kathode rays, for which our only source at present seems to be electrical discharges in high vacua. These rays have a wave length and a velocity which can scarcely be measured. I will not attempt here to state the figures. They are doubtless of the same general character as those manifestations seen high in our atmosphere, which occur at any or all times but which are more visible at night, to which we give the name of the aurora. There is every reason to think that both are produced alike by a stream of the corpuscles of which I spoke in the early part of this paper, or of that incomprehensibly attenuated matter to which in times past we have vaguely given the name ether, and to which Crooke referred in his description of the fourth or radiant state of matter.

When these discharges occur under our control and production it may be noted that the kathode rays will not only cause fluorescence and affect sensitized plates, but that they also will discharge bodies charged with electricity, their powers in this direction being more conspicuous than those of the ultra-violet rays. The reason for this last fact is that the kathode rays destroy for the moment the insulating properties of the air, and that the electricity consequently leaks away from the charged body. Apparently they do not show this effect through solid insulating material, nor even through the skin.

So far as the action of the X-rays upon micro-organisms is concerned numerous experimenters have reported various results, some of which are quite contradictory. Experiments have been made in various ways, with bouillon and plate cultures manipulated in various ways, and the organisms experimented with have been of all degrees of virulence. Perhaps the most instructive of these were made by Reeder, who exposed culture plates beneath sheets of lead with openings made in them so arranged that the rays would fall upon distinct portions of the culture further on, even excluding ordinary light by black paper. He found that the various organisms flourished in those parts where they were sheltered from the X-rays by the relatively opaque lead screen, whereas on the exposed areas they were either absent or feebly developed. That the chemical nature of the medium was not altered was shown by the fact that cultures subsequently grew upon these areas. These experiments are certainly suggestive and indicate the probability of inhibition of bacterial growth by X-rays, or else by electrical influences in connection with them, to which influences alike would be exposed those parts of the body which are subjected to the X-ray treatment of to-day.

The general conclusion which Reeder reached is, that bacteria outside of the body, in suitable media, can be deprived in this way of capacity for further development.

A number of experimenters have carried these investigations further, and after inoculating animals with various bacteria have exposed them to the X-rays. These results have been practically negative.

Passing now from electricity to light we must study it first by some of its effects. Our knowledge concerning the action of light upon living organism, animal or vegetable, is very inexact. It is known that the rays of the darker end of the spectrum, namely the most refracted, are those possessing the greatest degree of chemical and the least degree of heat activity. The reason for this is absolutely unknown. Studies on the effect of monochromatic light would seem to indicate that upon animal organisms the chemical rays seem to exercise something of a distinct influence.

That plants are very easily influenced by light has been firmly impressed upon my mind ever since I saw the late George Romanes demonstrate before the British Physiological Society, in 1890, experiments which he had made with fresh and tender young mustard plants. He sowed the seed in suitable small receptacles and when it began to sprout placed them in a dark chamber. In this chamber electric sparks were produced by an induction coil at varying rates. Invariably the plants turned their tops in the direction of the sparks even when these were produced so slowly as once a minute. It was as though every tiny plant were looking toward the source of the light. I have never seen these experiments of Romanes referred to, but it seems to me that they have an importance of their own.

This appears corroborated by this fact: The ultra-violet rays have the property of discharging a negatively electrified body. When such a body be provided with a zinc surface it has been shown that while the rays produced by an arc light required 12 seconds to discharge an electroscope the condenser spark would do the same thing in 5 seconds. Evidently then condenser sparks are very rich in ultra-violet rays. (Turner, Medical Electricity, p. 365.)

The effect of ordinary light upon bacteria has been studied by many observers, who generally agree upon the conclusion that light is of itself the best, cheapest and most generally available of bactericidal agents. Experiments with monochromatic light have shown individual differences, and it would appear that the heat rays are much less effective than the chemical rays. Gruber has shown that the violet rays have a much more pronounced effect upon ordinary earthworms than do the red rays, and that this effect is perceptible even upon decapitated worms. Dubois has made similar experiments with proteus, which is the most active in the darkness of the red rays and least so under the influence of the chemical. Fifty years ago the Vienna physiologist Bruecke demonstrated the color scale through which the chameleon would pass on changing from darkness to light, which changes are due to the pigment cells in the skin, and which he showed to be thus capable of migrating from the depths to the surface and vice versa. Paul Bert carried the experiment further and exposed one-half of the chameleon's body to red light and the other part to blue; under the former the skin remained light, under the latter it changed to dark. Numerous other experiments made upon animals would indicate the role played by light in their pigmentation.

So far as the human skin is concerned it is of course possible to very seriously affect it by heat rays, but it would appear that under ordinary circumstances it is the ultra-violet or chemical rays which produce both pigmentation and erythema, the latter often extending into a dermatitis.

The same effects are produced by sunlight in the polar region as in the tropics. It was Charcot who in 1859 first stated that the chemical and not the heat rays of electric lights produced skin affections identical with those produced by sunlight.

It would appear, furthermore, that the pigment in the skin serves as a protection against the chemical rays, which fact was perhaps first stated by Unna in 1885. In general we know that as we approach the equator we find mankind darker in color, and that the most gorgeous plumages are found in tropical regions. Moreover, the most exposed parts of the body seem to be thus most protected by pigment. The back is usually darker than the belly, and this is conspicuously so in the case of creeping animals and flat fish. Sunlight seems to have the same effect also upon vegetation, the degree of coloration depending not upon the intensity of the light but upon the number of chemical rays.

The irritative action of the actinic rays upon the skin may produce all sorts of lesions, from the mildest hue to a gangrenous destruction, depending not alone on the intensity of the light but the proportion of its chemical rays. These lesions are naturally more pronounced upon persons of light complexion or blondes, while albinos suffer most. Observers have studied the effect of electric light upon the skin and eyes. Maklakow in order to protect others studied the effect upon himself and suffered severely both in his eyes and upon the skin of the face, the pain and œdema of the face and conjunctiva being almost unendurable. Widmark, examining the subject for himself, found that when the ultra-violet rays were excluded the skin was uninjured, when the heat rays were excluded there was no particular difference.

In this connection there enters another factor, apparently unappreciated until Finsen and his pupils took it up. It relates in fact to this, that only such amount of light as is actually absorbed by the tissues is of injury to them. In other words, the actinic effect of light is directly proportionate to the degree of its absorption. When now we test tissues to see which has the greatest capacity of absorption we find that in reality the blood excels in this respect. This is a matter to be again alluded to, but it affords the explanation for the practical demonstration of the fact that the parts to be exposed to the Finsen light are to be made as bloodless as possible. Exposure to light is again the explanation for not a few of the pigmentary and other lesions of the skin, e. g. pellagra and xeroderma pigmentosum or melanosis lenticularis. The first appearances are met with upon those parts most exposed to light.

Again, the influence of light upon the course of variola seems to have been recognized for a good many years. It was first mentioned in 1832 by Picton and in 1867 and later by Black, Barlow and Waters. One will readily recall that the deepest and most numerous scars occur upon the face and hands. Finsen and numerous other observers have noticed that by keeping smallpox patients in rooms with red glass windows, similar to the dark rooms of the photographer, i. e., that by thus filtering out the ultra-violet rays, there was very much less tendency to markings on the skin. Finsen also calls attention to the fact that it is possible to more or less protect the skin from the infection of the chemical rays by painting it with tincture of iodine, or with solution of copper sulphate, or with some ointment. The iodine colors the skin yellow; the copper solution absorbs the actinic rays and tends to color the skin black, whereby all rays are kept out.

In this connection it is worth while to remember the fact alluded to by Petersen, that in the middle ages it was customary to treat smallpox with a red colored environment, since red bedding was used, red balls were placed inside the bed, etc. Exactly what the results were we do not know. In Roumania there used to be an ancient custom to cover the face and hands of smallpox patients with red cloth, and a French naval surgeon wrote sometime ago that he had often seen in Tonkin these patients shut up in alcoves which were completely closed with red hangings.

At all events it would appear that the exclusion of chemical rays should be *absolute;* that it should be continuous until the vesicles are completely dried up; that even a short exposure to light materially damages the result; that the treatment should be begun very early; that it in no wise interferes with any other treatment, and that by resorting to it suppuration and disfiguration can be remarkably diminished in degree and extent if not absolutely prevented.

Finsen has also carried out a number of interesting observations upon the irritating properties of chemical rays. For instance, very young salamanders lying at the bottom of a dish of water are not disturbed by red or yellow light, but by blue they were promptly excited to movement; so it was too, as before remarked, with the ordinary earthworms which would collect beneath the red and avoid the blue glass. Gruber had also the same results, from which it would appear that various animals can distinguish by their integuments between red and blue; while they seem to enjoy the former, they avoid the latter tint. He found this true to such an extent that he described a specific photo-dermatic sense. The same thing may be seen even with common house flies. Indeed the effect may be so pronounced as in certain cases to produce reflex motions in embryos and lively reaction in various smaller animals. It thus would appear that light is awakening in more than one sense.

Nearly all investigators having agreed that light is a powerful bactericidal agent, it is not strange that certain infectious diseases of the surface of the body, when exposed to it, have been found to yield to the treatment. In fact, at present it seems to be a question merely of the depth to which its effects may be made to be felt. There is no better illustration of a lesion of this kind than ordinary lupus. There is no question but what sunlight would be always the most serviceable for this or similar purposes were it always available. When it can be used a very simple chambered plano-convex lens, can be used for the purpose. It should be several inches in diameter, with chamber open at the top in order to permit it to be filled with a methyl blue or blue vitriol solution, by which the heat rays are filtered out. This only needs to be mounted as is a compass in order to permit of its use whenever the sun is shining brightly.

I have already remarked upon the light absorbing powers of the blood. A very simple experiment may be tried at any time which will show the necessity for rendering the parts exposed to phototherapy as bloodless as possible. A piece of sensitive albumen film may be placed behind the ear in contact with the cartilage. If now the ear be exposed to ultra-violet rays, even for several minutes, without compression, the effect upon the film is relatively small, but if the cartilage and the paper be pressed together between glass plates, so that the blood is expelled from the living tissue, the paper will be promptly blackened in less than 20 seconds' exposure. This is an experiment so convincing that it justifies all the efforts made to render parts anemic. Hence the various compressors and pieces of apparatus which are used for this purpose. Only inasmuch as it is known that ordinary glass itself filters out a large proportion of ultra-violet rays, it becomes necessary in order to obtain the best effects to use compressors made either of ice, rock salt or quartz, since these easily permit the ultra-violet rays to pass through them. The instruments used now should all be provided with quartz plates and adapted to this purpose; hence the expense attached to such apparatus. It is desirable also that the patient be so exposed that the light shall fall perpendicularly upon the affected surface. Working thus with rock crystal and with an electric lamp of 80 amperes Finsen claims to have destroyed the micrococcus prodigiosus in one minute, and to have practically disposed of lupus nodules, so that they would shrink up and disappear after fifteen minutes' exposure.

This matter of the total exclusion of glass and substitution of quartz or rock salt is more important than has been generally appreciated. The violet rays easily pass through glass but the ultra-violet rays are almost completely excluded by it. Again the difference between the effects produced by the ultra-red and ultra-violet rays should be emphasized. The former, the heat rays, produce more or less redness of the skin which quickly disappears. On the other hand, the actinic rays produce scarcely any reddening, while their maximum effect is not attained for from twelve to twenty-four hours.

Practically we have to produce the ultra-violet rays either by using sunlight, which limits the production, or by one of two artificial means: the utilization of the arc light or by electric sparks from a condenser. There will always be a certain disadvantage attaching to sunlight, namely, the amount of heat radiation, which must always be prevented by some filtering arrangement, and while copper sulphate solution, e. g., will answer this purpose, it also takes out some of the other rays which one does not want to lose.

If an arc light could be provided with iron electrodes a much larger number of ultra-violet rays would be given off than are produced by carbon, but then the arc light so made would be a source of a large amount of radiant heat. Electric sparks are known to give off light of high actinic value, and so-called condenser spark lamps have been devised, and are now on the market, by which a discharge is made to pass between two electrodes, which preferably are of iron. Such lamps are useless, however, unless they are provided with quartz fronts or lenses.

The salts which ordinarily fluoresce are not so sensitive to the ultra-violet rays as to the Roentgen rays, and the fluoroscope cannot be used with the Finsen light.

The ultra-violet rays have this most peculiar property, that they can discharge a negatively electrified body, in which respect, of course, they differ from the condenser sparks, which will discharge any charged body, from which it is evident that the condenser spark is very much richer in these rays than the arc light. They can also produce nuclei for cloud condensation in moist air, and finally, in addition to this, they have a special action on the skin, at least of the higher animals, and on the entire tissues of the lower animals and plants which has been already noted.

When tested carefully as to its transparency to the ultra-violet rays a sheet of glass one twenty-fifth of an inch thick proves to be as opaque as a piece of hard rubber one-fourth of an inch thick or as the entire hand. The most transparent material is polished pure rock salt which must, however, be kept both clean and dry in order that it may preserve its properties.* A condenser spark lamp has also this advantage, that it does not radiate heat and that only a simple cooling arrangement is required, and that while rock salt forms the best compressor a piece of ice may be advantageously used, since the anemia produced by this pressure is increased by its coldness and its opacity to radiant heat.

SUMMARY.

We thus have two therapeutic agencies affording us methods of treatment which are so new and to such an extent still on trial that we must hesitate lest enthusiasm run away with judgment in discussing their merits and their applicability.

Nevertheless the results of extensive experience may at least be formulated in the following safe and warranted conclusions:

1. They afford methods of treatment for extremely new growths of limited area and superficial character, which, while not exactly certain, are extremely promising.

2. They not only cause no pain but tend to relieve pain, both superficial and deep, in a most pleasing and satisfactory way.

3. They are adapted to cases which can hardly be submitted to any other method of treatment, and they afford more hope in delayed or inoperable cases than does any other method of treatment.

4. It will be found that the odor of putrefaction may often be suppressed by their use and the putrefactic process itself checked.

5. Burns and intense dermatitis, so frequently noted when the treatment first came into vogue, may now be almost certainly avoided.

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*At the meeting of the American Physical Society in Dec., 1902, Prof. R. W. Wood described and exhibited a screen which was transparent to ultra-violet light, while being opaque to the rest of the spectrum. Such a screen is very useful in photographing ultra-violet spectra, since it enables the overlapping spectra of other orders to be eliminated. The author showed an interesting lecture experiment in which the rays of the lantern, after passing through such a screen, were concentrated to an invisible focus, where a suitable fluorescent substance was excited. The screen was made by combining a gelatine film containing nitroso-dimethyl-aniline with copper oxide and cobalt glass.—*Science,* Jan. 30, 1903, p. 182.

6. More than this, they afford a supplementary method of treatment after operation, by which the benefits of the same may be enhanced and enlarged.

7. It is not necessary to intermit such work as the patient may be engaged in in order to carry out the X-ray or photo-therapeutic method of treatment.

Of course it is not fair to expect too much of such agents, especially of those so new. One of the most comforting aspects of their use is the relief from pain which they afford, even when this pain is deep-seated and of uncertain origin. Even such use of the X-rays as is called for in an ordinary fluoroscopic examination, has been known to relieve pain, although by it nothing else was accomplished.

What it may accomplish in deep cases is as yet pure conjecture. Without entering into detailed reports I am at least positive of this, that in certain inoperable cases of intra-peritoneal cancer and tuberculosis, accompanied by more or less ascites, kathode rays have certainly relieved pain, retarded extension of the disease and apparently been of great benefit, even if such benefit prove but temporary. This of itself is of greatest value, and can be accomplished better in this way, perhaps after an abdominal section, than by any other measure with which I am acquainted.

The X-rays apparently will also relieve itching in certain instances, and may especially be used for removal of hair, for cosmetic reasons or in treatment of sycosis, of favus, of psoriasis, and will be found serviceable in the removal of those birthmarks which are covered with, or surrounded by, considerable growth of hair. So far as photo-therapy is concerned, it must necessarily find its widest range of application when the disease is limited to a small area and is superficial. Morris and Dore have shown (British Medical Journal, February 9, 1901, p. 326) that there are certain skin conditions which are not favorable for photo-therapy, especially such scarring as results from previous scraping, pigmentation by which the ultra-violet rays are intercepted, vascularity in those parts where a compressor of some kind cannot be applied, deep lesions, and those of skin or mucous membrane whose location makes it difficult of treatment, e. g., about the eye, in the nose, mouth, etc.

February 1, 1903.

AN EPITOME OF THE HISTORY OF CARCINOMA.

By Roswell Park, M. D., LL. D.

No one can scan the voluminous literature of cancer without being at first bewildered by the confusion of names and the loose and almost meaningless way in which the term and its various synonyms have been used. It is bad enough even to-day when one writer describes a growth as cylindroma and another writer rejects the term. If this be bad to-day when we have reasonably accurate notions of what constitutes cancer, how much worse must it have been centuries ago when a hundred different conditions were described under the same general term. It does not seem worth while to go back to the beginning of the Christian era since the writers who followed Hippocrates simply represented his views, and we do not need to trace them into antiquity. Let us then begin with Celsus, who wrote " carcinoma " in its Latin spelling and did not use the Greek " karkinoma," although many of his translators have done so.

In his day, and long after, ulcers of all kinds were confused with tumors of all kinds, which will account for his making particular mention of venous stasis and swelling veins, and noting the fact that sometimes carcinoma causes pain and breaks down into an ulcer and at other times not. He took this view—that if the actual cautery produces no bad effect the disease is curable, whereas if the growth is stimulated by the cautery it is a carcinoma and active therapeutics must be discontinued. It is a curious fact that the theory of the development of cancer given by Celsus should be made the basis of an essay by Schmalz in 1825 *(Surgical Treatment and Surgical Diagnosis).*

The early writer and his late imitator distinguish some sixty or more different kinds of ulcers, among them those due to a peculiar diathesis, *i. e.,* cancerous, and so he described ulcus cancrosum, cancer apertus, cancer genuinus, noli me tangere, open cancer, glandular cancer, etc. Celsus used frequently the term cacoethes in the substantive sense, whereas Schmalz uses it as an adjective, *i. e.,* cancer-like. In his clinical descriptions Celsus was painstaking and often accurate. In fact he used adjectives very freely. Chironium and telephium were terms applied to an ulcer accompanied by severe pain, induration and general formidable appearance with tendency to spread. Such terms might apply equally well to a malignant ulcer or a chancroidal bubo.

According to the Celsian view, should the suspected ulcer not improve under appropriate treatment it is certainly a cancer, but no one could make the decision without time and experiment. Writing of this, Thiersch quoted the *bon not* of Duparque to the effect that "Cancer is incurable because it cannot be cured; the reason we cannot cure it is because it is incurable; therefore if one by chance should happen to cure it, it must be that there was no cancer." They had in those days also what was called *thymium,* a lesion of doubtful character, about which there was much uncertainty. Celsus remarks that "it is like a wart, and therefore in some respects must be different but occasionaly is found on the surface of an ulcerating cancer. Nevertheless it has an independent growth of its own."

This would look like the so-called "proud flesh" of the laity as the expression, "then comes the ulcer and from it the thymium," would imply. This word, by the way, is spelled also tymium and timium. The expression seemed to the writers who used it very apt, although the younger Pliny used it in the sense of a simple swelling, and applied it indiscriminately to a boil, a pile, or a condyloma. The thymium was not very different from what was called *akrochordon,* which was described as species of wart, sometimes very painful, ovoid in shape, connected to the skin by a slender stem and known as the "hanging wart." It was so-called because the cutaneous surface resembled the cut end (*ἄκρα*) of a harp string (*χορςή*). According to some descriptions the former would appear to be a simple horny outgrowth from the skin, and the latter a fungous papilloma; according to others, who use the expression *pessimae,* we are compelled to regard them as something more serious. In addition to the terms now strange to us, above mentioned, Celsus also used the words *murmakia* and *clavus,* which latter is still in use. Clavus in his day seems to have signified a pus-producing swelling.

Celsus seems to have been conversant with the step by step process of infection, both malignant and pyogenic, but I think that we waste time in trying to determine more minutely just what he in his day meant by these terms which I have thus far rehearsed. So late as 1777 Blancardus contented himself with presenting this subject practically in the language of Celsus, adding nothing thereto, and having in his preface scarcely a word to say for himself on the subject; but the more one examines Blancardus the more evident it is that he was destitute of enterprise in medical research. There is no question that Celsus lived at a time when men had no use for the exact sciences, as even the elder Pliny acknowledged. The world was given over to excess and debauchery, and the worst form of imperialism controlled Roman thought. Medical literature of that date consisted mainly of formulæ for cosmetics, and while the baths were conducive to health and to cultivation of artistic taste, they were destructive to public morality. Some effect was produced by the alarm voiced by Plutarch and Tacitus, by the merciless satires of Juvenal and Perseus, and by the well directed philosophy of Seneca.

In the year 131 Galen was born at Pergamos, and he finally appeared in Rome as the private surgeon and medical adviser of the young Commodus. He curiously mingled philosophy and medicine, and combined with the humoral pathology of Hippocrates a pneumodynamic theory mainly his own. To him the malignant character of cancer was well known, and he added to the views of his day concerning its internal manifestations. "In the breasts we often find a tumor in size and shape closely resembling the animal known as the crab, for as in the latter the limbs protrude from either side, so in the tumor the swollen veins radiate from its edges and give a perfect picture of the crab." Here will be seen perhaps the first publicly stated reason for giving to this disease this particular name. He also busied himself with its treatment, and while he considered cancer to be the product of black bile, was not opposed to operation but gave this advice: first to get rid of the black bile by appropriate remedies and then to attempt a cure by milder applications since "the more severe remedies merely increase the evil." He told us that there are many metallic compounds which, taken with purgatives, have a beneficial effect upon the disease in its early stages, concluding that if one is "minded to try the cure of cancer by surgery he must as before begin by purging the evil humor, and then immediately proceed to the removal of the diseased part so thoroughly that there shall be nothing of it left, by letting the blood flow freely and being in no haste to check it, but rather squeezing out the thick black blood from the swollen veins." Galen thus showed that he recognized that cancer possessed a malignancy peculiarly its own, for which reason he advocated the combination of medicine and surgery.

Galen operated for cancer with the knife and cauterized the wounds, not alone for hemostatic purposes but for the destruction of any remaining diseased tissue. He noticed that successful results occurred when the operation was carried out, and his language as well as his actions show that he was familiar with true carcinoma, although he was not aware of the function of the lymphatics. He nevertheless was earnest in calling attention to what he knew of metastasis, even through the venous circulation. Evidently with him also it was not only the amount of the humor but its character which determines the subsequent growth, but he says it is the thinnest of these humors which give rise to the herpetic ulcer while the thicker causes cancer. Galen's general pathology was a sort of organic theory of disease. He maintained, in opposition to Archigenes, that it is always by reason of disordered function that a part becomes diseased, and that an organ can only become directly diseased as a result of transmission from other diseased foci. Hence we can readily understand his object in always preceding an operation for cancer by a system of general treatment. If therefore he became enthusiastic in his praise of phlebotomy, or his use of purgatives, we must give him credit at least for some sort of rational basis for his therapeutics.

Following the death of Galen medicine entered upon a period of quiescence if not somnolence. Leonidas of Alexandria, some 200 years after Christ, wrote as follows, if we may trust Aëtius: "If therefore the breast be entirely involved in the scirrhotic growth so that the surrounding part is endangered should an amputation be attempted, under no circumstances should we operate. If, however, the apex or only one-half of the breast be included in the growth, the breast should be removed and the wound cauterized." When he feared hemorrhage he often operated in two sessions, for he says: "I then cut a second time and dissect out the whole breast and afterwards cauterize the wound, often repeating the cautery." The first cautery was for hemostasis, the second for the extirpation of infected tissue.

For several centuries nothing of interest transpired until we come to the writings of Alexander of Tralles, who excelled rather in treatment than in diagnosis. In his ninth book he discusses cancer and offers several methods of treating it from a humoral point of view. Among other things he highly praises the treatment of cancer of the liver by the use of chalybeate waters.

The work of Paul of Ægina is mainly a compilation, in the fourth book of which he treats of external diseases, among them cancerous tumors, for the treatment of which he repeats Galen's precepts; particularly the advice that all operations are to be preceded by free purgation of the black bile. After Paul there came little of any value. Nonus and Mercurius in the tenth century were absolute compilers, and Myrepsos, another of the same class, was dubbed by his contemporaries "the perfumer," polypharmacy being his strong point. His book on medicine is an alphabetic breviary, divided into 48 chapters, containing some 300 senseless prescriptions with pathetic appeals to God and Christ. His treatment of cancer is included under the head of "aromatics and specifics for the cure of lice and spots on the skin."

The Arabs were too firmly bound by the authority of Galen to make any advance. They added still more to the polypharmacy of their day, and not until the time of their later scholars was anything of value said regarding cancer. Avenzoar, however, who was really of Hebrew origin, showed a rather remarkable knowledge of pathology, as is illustrated in his discussion of cancer of the stomach. Some of their writers advised early extirpation of cancer and of all infected tissue. Albukasim remarks, " When cancer has become old and large you should have nothing to do with it. I have never been able to cure one, nor have I ever seen any one who has."

The notions of the Arabians were reflected in the Latin writings of the middle ages. William of Salicet says " Cancer is a tedious disease—the more you interfere with it the worse it becomes." He frequently termed it *noli me tangere*. Lanfranchi says: " The general rule with cancer is that it can only be cured when it can be entirely removed, along with its roots." He had noticed the occurrence of cancer in badly healed wounds and advised their partial cauterization—for the purpose of diagnosis. If the growth increased it was an original cancer. Guy de Chauliac endeavored to recognize the cause of cancer; his conclusion was: " Ulcerating cancer is caused by the existence of a former non-ulcerating cancer, or the irritation of chronic ulcers." He also held that if it be in a locality where it can be entirely removed it should be operated; if not, no attempt should be made save at palliation. He advised caustics for causing the death of suspicious tissue, and considered arsenious acid as desirable for this purpose. If the diseased tissue was thus completely destroyed the fact was shown later by the advent of a scar and healthy appearance of the adjoining flesh.

But in time all operations fell into disrepute and cancer came to be regarded as practically incurable. The theorists of the middle ages, with their immutable dogmas and superstitious reverence for Galen, obstructed progress in every direction. Cancer was as before, " an ulcer of horrid appearance, evil smelling, and presenting a hard, thick, discharging, everted border."

It was centuries before men could break away from the use of the red-hot knife. The celebrated Fabricius, he of Aquapendente, advised that glands be seized by forceps and cut away with a red-hot knife, or that an incision be made about the breast with a wooden or horn knife previously dipped in aqua fortis, and the glandular substance subsequently removed by the means of the finger and nails. But let us give the credit due to Fabricius for the suggestion to feed by a tube introduced through the nose into the stomach in cases of œsophageal contraction.

Paré, great man as he was, did not make the advance in this direction which might have been expected of him. He did not even do as well as did Fabricius Hildamus, who achieved the title of a noted operator because he operated with the knife, ligated the vessels, and dissected with his fingers. He also cleaned out the axilla in breast cases and conducted many cases to recovery. Paré was in most respects a follower of Galen. Dyscrasis was the ghost that haunted medical literature for centuries, and is not even yet quite forgotten. " Cancer is from black bile," said Galen. " Cancer is the product of melancholie," falls like an echo from the lips of Paré, who described under the head of melancholic tumors true scirrhus and other cancerous tumors corresponding to the cacœthes of Galen.

Paré distinguished four kinds of tumor due to black bile:

1. The hard schirrus proper, which is accompanied by no pain, is not sensitive on pressure, and is caused by natural black bile.
2. The imperfect, rough, painless, stone-like schirrus, which is caused by great chilling or disintegration of humors.
3. The cancerous schirrus caused by heating and corrupting of the humors.
4. The schirrus phlegmonides, which is caused by the mixing of the bile and the blood.

Paré's treatment for these various conditions included abstinence in all respects, the classic method of black bile purgation and the external use of counterirritants, fumigations, mercurial plasters, goat dung, and many other more savory applications, beyond which ingenuity could scarcely go. Paré described the transition of cancer occultus into cancer apertus, *i. e.*, non-ulcerating into ulcerating forms as clearly as any clinician could desire. The pain, irregularity of shape, tendency to hemorrhage, oozing discharge, infiltration, etc., he faithfully portrayed. On one of his pages he gave a picture of a large sea crab, and says: "Also the cancer is brownish blue in color, and uncouth in shape, like the animal whose picture is appended." He realized that women are more subject to cancer than men, called attention to the frequency of infiltration and metastasis, did not decry operation, but reminded his readers of the thirty-eighth aphorism of Hippocrates, which counsels against operating upon deep-seated, occult cancers or those of long standing, or those occurring in patients of feeble constitution. He advised the use of sweet milk to destroy the odor of cancerous discharge.

His operative methods comprised two distinct procedures: the excision of the tumor with a broad margin of healthy tissue, with compression of the neighboring vessels and vigorous use of the hot iron, or the elevation of the tumor by means of a thread passed through it, its extirpation by means of scissors, with lateral incisions when necessary for relief of tension.

Throughout the seventeenth century black bile continued to be regarded as the chief cause of cancer. Frere Côme set a good example to posterity when after having purchased a secret nostrum he made public its ingredients, which were about as follows:

Cinnabar	2 parts
Ashes of old burnt shoes	3 parts
Dragon's blood and white arsenic, each	12 parts

This was applied in dry powder or in paste mixed with oil.

One of the earliest real departures made from the old tenets was that of Le Dran, who in 1757 published a work in which he showed the purely local character of cancer in its beginning and then formulated the best methods of cauterization. He devoted considerable space to the discussion of tumors of the breast of which many are curable, and expressed the opinion "that not all is cancer which has been taken for such." Soon after this came Louis's publication on fungous growths of the dura and diseases of the eyeball, including cancer of the eye. Still confusion of terms complicated everything, and in Plenk's essay on skin diseases, published in 1776, he described 18 sorts of tumors, including inflammatory tumors, pus tumors, gangrenous tumors, hard tumors, water tumors, blood tumors, etc. This reminds me very much of the hospital that I visited in Seville a few years ago, where one ward was reserved for "Dolores," all patients who were suffering pain being sent there.

Richter describes two classes of tumors: Inflammatory and non-inflammatory, placing cancer among the latter. His remarks are quite in accord with those of van Swieten, who describes them as bad smelling, easily bleeding, rodent, ulcerating growths, which are found on the lips, tongue and genitals. Schirrus they described as a hard, painful tumor situated in an organ rich in glands and having a tendency to cancerous growths, and then admit that these growths may arise from cracks, excoriations, styes, etc. Even Richter could not get away from the old black bile, but he held that it could not arise from inflammation alone. He regarded dyscrasiæ as predisposing elements in causation of cancer. Together with his colleague Schmucker, he denounced bitterly the use of corsets as the invention of "that accursed Pompadour."

While Hunter's contemporaries were playing with belladonna and rabbit skins and all sorts of quackery, Hunter himself was experimenting with the control of fixed tumors by means of compression, but by fixed tumors he meant inflammatory lesions whose nourishment he was trying to reduce by pressure. Fischer and Desault were trying to accomplish the same thing in the case of rectal cancer by the use of rectal bougies. The writings of Munro threw operative treatment into such disrepute that the Amsterdam Guild of Physicians felt called upon to offer a prize of 100 ducats for a safe and practical method of curing cancer. As may be imagined, numerous remedies were proposed, and now came into repute the wonderful properties of cicuta (water hemlock or cowbane) which ran about the same course in those days that cundurango did in ours. As the result of disappointment with all these remedies, operative methods came back again into vogue. Cancer of the breast, lip and scrotum were generally operated upon. Finally Petit gave formal expression to insistence upon the necessity for the removal of swollen glands of the axilla in cases of cancer of the breast.

And next came the French Revolution, which not only shook the nation to its very foundations, but was a new era in that the authority of the ancients was no longer revered. A cold materialism sought to derive everything from the inherent properties of matter. Mysteries were no longer tolerated. The doctors of Paris even went down to the halls of death and sought to find the seat and secret of life among the still bleeding heads of those who had been guillotined. It was in 1773 that Peyrilhe declared that to cure cancer, even to define it, was extremely difficult, which bit of wisdom won for him the Dijon prize. Morgagni died in 1771; just thirty years later Bichat gave the final touches to his great work on anatomy. During the winter of 1801 he himself made 600 autopsies in the Hôtel Dieu. Of his work Corvisart wrote to Napoleon that no one in so short a time had done so many things and done them so well. He was the first to distinguish between stroma and parenchyma in tumor tissues, although he ascribed a fallacious importance to connective tissue.

Bichat's spirit survived, although he died a most untimely death, for Laennec made a sharp distinction between carcinoma together with tubercle, and melanotic and other growths, basing this upon their histological structure. Some of the writers of that day saw about these cases that which they regarded as infection, and endeavored to trace its path in the blood vessels and thoracic duct. In the same way we owe to Laennec our insight into the relation of cancer to the internal organs. He also pointed out that schirrus is not merely a hard tumor and a forerunner of cancer, but of itself a distinct form of connective tissue cancer, which he classed along with the encephaloid, melanoma and tubercle being placed among heterologous growths.

It was perhaps Lobstein who first divided tumors into the homologous and heterologous or heteroplastic. He held that those of the latter form arise from some form of lymph that has been introduced into an organ from an outside source. This lymph was compared by Lobstein to Hunter's wound and infiltration lymph, agrees entirely with the blastema and exudate of Rokitansky and even later authors, and is either benign or malign, the latter giving rise to cancer. By the efforts of the school to which Lobstein belonged, including such men as Andral and Cruveilhier, Billard and Velpeau, the differential diagnosis of tumors of the breast was greatly advanced, while such men as Astley Cooper in England and Walther in Germany were quite won over to these views.

After this the French rather retired from their advanced position, and their place came to be occupied more by German investigators. Stieglitz, writing in 1840, made this sad confession concerning his German colleagues: "German medicine is so far degraded and spiritless that any stimulus whatsoever that pushes it forward in a new road is sure to be of benefit, even though the path be beset with errors and perversities." Soon after this, however, all Germany began to move forward and scores of names are inscribed in imperishable characters in its history of medicine for the past half century. The theory of cancer profited by this forward motion and soon appeared in new dress. In the beginning of the third decade microscopical diagnosis was still a *pium desiderium.* Johannes Müller, after years of work, described six kinds of operable tumors and seven kinds of carcinoma, which could not be cured by extirpation. Our knowledge was materially advanced by the researches of Schleiden and Schwann into animal and vegetable cells, by which many other things were to be reconciled. The allusions of Müller, in his third edition (1838), to the more delicate structures of pathological growths called forth numerous contributions of a similar character from other writers. Moreover, he held that cancer formations do not arise from primitive tissue by degeneration but are produced by new cell formation, deposited as a specific element of disease in the normal connective tissue of the organ. He found also in this statement an explanation for the general infection certain later to pervade the whole system. Translated into the thought of to-day, the most advanced of us would scarcely go beyond a similar doctrine. Müller is believed to have been the first to demonstrate the presence of nucleated epithelium in cancer. Naturally, with such views, Müller discarded all distinction between homologous and heterologous growths. This was taken up by Henle in 1839 and by Vogel in 1842, and an effort was made to prove that each growth is really a variation from normal growth due to defective or to active individual mother cells. About this time also began the attempt to discover specific cancer cells, with the microscope, whose significance would be of greatest importance in diagnosis. This effort was carried altogether too far, since some enthusiasts denied the accuracy of all diagnoses where such cells were not found.

In 1847 great mischief was wrought by the introduction of the term cancroid by Bennet. This was to be the term by which all growths were to be known where the specific cancer cell could not be found. Then Virchow and Förster, as well as Lebert in 1850, limited the term chancroid to diseased tissue which presented alveoli with epithelial collections. Therewith epithelial cancer became the cancer par excellence, and many tumors took the name of sarcoma which hitherto were considered carcinoma. In 1852 Hanover introduced the term epithelioma, and Robin and Bidder described cylinder epithelium cancer. By this time confusion in terminology was almost complete, and now for several years the epithelial cell, in epithelial cancer, was regarded as arising independently of preexisting epithelium from connective tissue corpuscles. It was apparently von Bruns who in 1847 first emphasized the role of the lymphatics in spreading this disease. Even in 1856 the condition was still regarded as uncertain and was the cause of many controversies.

J. Müller had already reported upon the spores given off by the body humors in cases of carcinoma, and it had been frequently noticed that in cases of melanotic cancer these were heavily charged with pigment. It was not long now before pathologists were divided as between those who held that primary cancer becomes constitutional by a general infection through the blood vessels, by means of a blastema or virus of some sort (theory of infection) and those who regarded the constitutional effects as due to the transmission of epithelial constituents and debris (theory of transplantation). Others yet saw in primary carcinoma only a local expression of a general carcinosis already acquired. The rest of the history of cancer is certainly well known, and it is scarcely necessary to attempt to bring it down beyond the pioneer experiments of Waldeyer and Volkmann's early researches. It was through these studies that some sort of order was finally restored, and that ideas which presented an indescribable jumble were more or less simplified.

SPECTROSCOPIC ANALYSIS OF THIRTY-SIX VARIETIES OF CONTINENTAL AND AMERICAN ORTHOCHROMATIC DRY PLATES.

By F. S. Low, Assistant in Photo-Chemistry.

The multiplicity of uses to which orthochromatic plates are put has of late years so increased the number of brands on the market that scarcely a dry plate maker exists who does not offer one or more varieties of this product to the purchasing public. From this greatly increased demand and production certain improvements and a greatly increased variety of plates have resulted, and there are at least some makers whose products present a high degree of uniformity. The greatest advance has been in the keeping quality of the plates. Every operator who has employed color sensitive plates under exact conditions, such as in microphotography and three-color reproduction, has, however, learned, in most cases to his sorrow, that the plates have seldom fulfilled the claims of the makers.

The claims made for plates are usually of a very general character, ranging from the statement that they are "highly orthochromatic" to specific data in the case of a very few. The disadvantages of this state of affairs are naturally great. In the photographic work of this Laboratory, which includes more or less all the photographic processes, we have found it absolutely necessary to analyze the different brands in use. As a result we have been able to select plates best adapted to the subject in hand. For this purpose we use a simple diffraction spectroscope fitted with a replica of a Rowland grating. These replicas can now be had at a small cost, and every dry plate manufacturer, as well as every scientific photographer, can afford to possess such an instrument. With such a spectroscope the testing of the plates is a simple matter. The spectrum obtained by the grating is projected upon the plate by a photographic objective, and the dark slide is so arranged as to permit a series of exposures on one plate. The time of these exposures, the illumination (sunlight at a certain elevation) and the length of development with a standard developer being determined, it is possible to chart the distribution of the sensibility of the plate.

As, on the whole, more reputedly good orthochromatic plates are to be had on the continent, especially from German and French makers, we purchased in the open market two packages from each maker and tested plates from each package. With the continental plates we have also tested the leading American brands. There remain yet certain English brands which deserve attention, and these we hope, for the sake of completeness to add to those here published. As the results obtained are not only of interest but have proven of great use to us, we have decided to publish the thirty-six varieties so far tested. All exposures have been made with a wedge-shaped slit which enables us to construct a curve representing the relative sensibility of the plates. In the diagrams the relative speeds of the various plates are represented by vertical values in the curves, while their color sensitiveness is represented in horizontal values. Sunlight has been employed as the normal standard, the different Fraunhofer lines enabling us to determine with ease the distribution. In each case we give an underexposed and a normally exposed spectrum. It will be seen that the distribution and in many cases the sensibility of the plate in underexposed negatives shows great defects. For instance, in brands No. 5, 11, 15, 25, 26, 27, 28, 29, 32 and 34 there is a distinct break in the continuity of the spectra, usually in the neighborhood of the E line. In many of these brands this defect is more or less repaired in the fully exposed plates. In using these plates it is therefore imperative that the negatives be fully exposed. In underexposed negatives from these varieties strengthening will not repair but increase the defect, as the plate in the region of the E line has not been affected by the light in question.

The relation between the yellow-green sensibility and the blue sensibility is in orthochromatic photography very important. Many of the plates show extreme blue sensibility and very low yellow-green. The poorest showings in this regard are Nos. 4, 5, 8, 9, 17 and 24. These varieties would require a very dense yellow or orange screen, and when properly corrected would prove very slow. A number of varieties will be found in which the yellow-green sensibility is equal or nearly equal to the blue. A yellow screen to reduce the blue would render these plates orthochromatic.

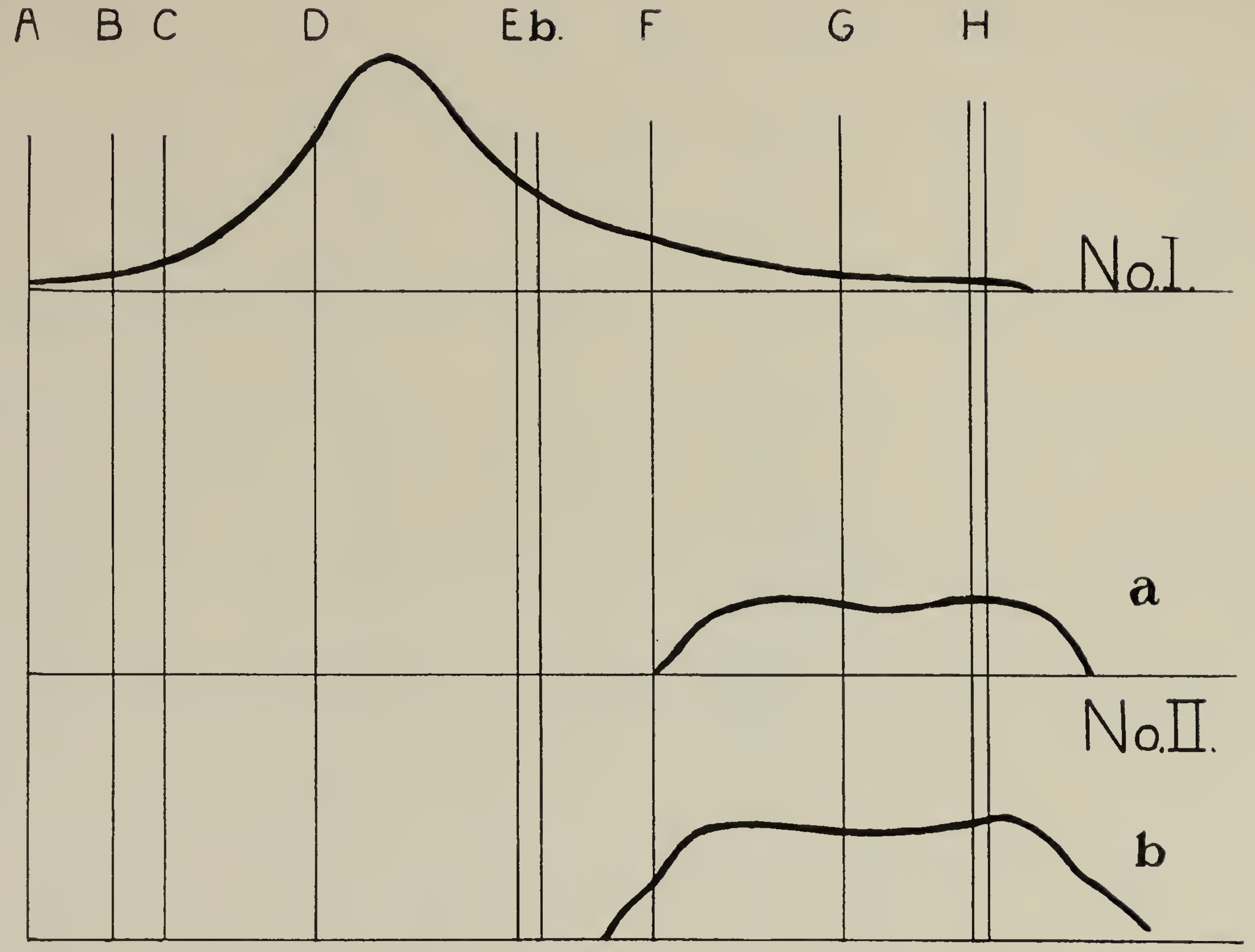
It is perhaps well to recall the order of relative luminosity which the colors of the spectrum present to the human eye. The most brilliant are orange, yellow and green, the least red and blue. The relative brilliance of the colors is shown by the accompanying curve (Fig. I). The plate which most nearly represents this curve and which has a much greater yellow sensibility is No. 29. This plate can, as the manufacturers claim, be used with success without a correcting screen. A very pale yellow screen would render the curve more exact. A number of other varieties will be found in which a comparatively pale screen will accomplish the same purpose. The varieties which show red sensibility are 15 and 28, while No. 29 shows marked orange sensibility. In No. 15 the blue sensibility is greater than the red and yellow, while a wide area of relative insensibility extends over the green. No. 28, on the other hand, shows a practically continuous spectrum with a slight depression between the red, orange and green, and between the green and blue. Both of these plates can be used for three-color photography, No. 28 for all three exposures, and No. 15 for the red and blue, with a green-sensitive plate for the green exposure, such as 23 or 33. No. 28, the Perchromo plate of Perutz which is manufactured after the receipt of Miethe and Traube, is said by these authors to give the relative sensibility of the three exposures, as, 1 for the red, ½ for the green, 1 for the blue. Allowing for the density of the different screens it would appear from the spectrogram that these figures are correct. The general sensibility of the plate is, however, not great. A surprising green sensibility is shown in No. 36, the only film tested. This variety would require a deep yellow screen to correct the blue sensibility.

The appended curves are plotted from what we considered to be a normal exposure. It is somewhat hard to say how much farther into the red the curves could be made to extend by longer exposure, as the portion of the plate covered by the spectrum gradually becomes affected by reflected light as the exposure is lengthened, making it difficult to determine with exactness just how much of the action is due to direct light and how much to reflected.

I wish to express my thanks to Dr. Gaylord for suggestions leading up to and during the course of this work.

I. Fraunhofer luminosity curve.
II. Ordinary gelatine bromide plate.
1. Dr. Smith's Swiss plates.
2. Hauff orthochromatic, extra sensitive.
3. Hauff orthochromatic, isolar.
4. Bremer orthochromatic.
5. Bremer isolar and orthochromatic.
6. Steinschneider's erythrosin orthochromatic.
7. Sandell color sensitive, isolar.
8. Sacs plain orthochromatic.
9. Sacs plain orthochromatic, isolar.
10. A. G. F. A. plain orthochromatic.
11. A. G. F. A. orthochromatic, isolar.
12. Kuzka plain orthochromatic.
13. Mather permanent orthochromatic.
14. Lumiere A green sensitive.
15. Lumiere B red sensitive.
16. Talbot orthochromatic.
17. Lomberg plain (non orthochromatic).
18. Badische erythrosin.
19. Apollo plain orthochromatic.
20. Weisendorph and Weimer plain orthochromatic.
21. Weisendorph yellow sensitive erythrosin.
22. Dr. Schleussner's plain orthochromatic.
23. Dr. Schleussner's "Viridin," yellow green.
24. Herzog plain orthochromatic.

25. Schippang's F erythrosin silver process plates, color sensitive.
26. Schippang's B erythrosin silver.
27. Schippang's B erythrosin.
28. Perutz perchromo.
29. Perutz perxanto.
30. Perutz perorto.
31. Perutz eosin silver.
32. Seed's orthochromatic.
33. Cramer's orthochromatic.
34. Forbes orthochromatic.
35. Eastman's " Kodoid " orthochromatic film.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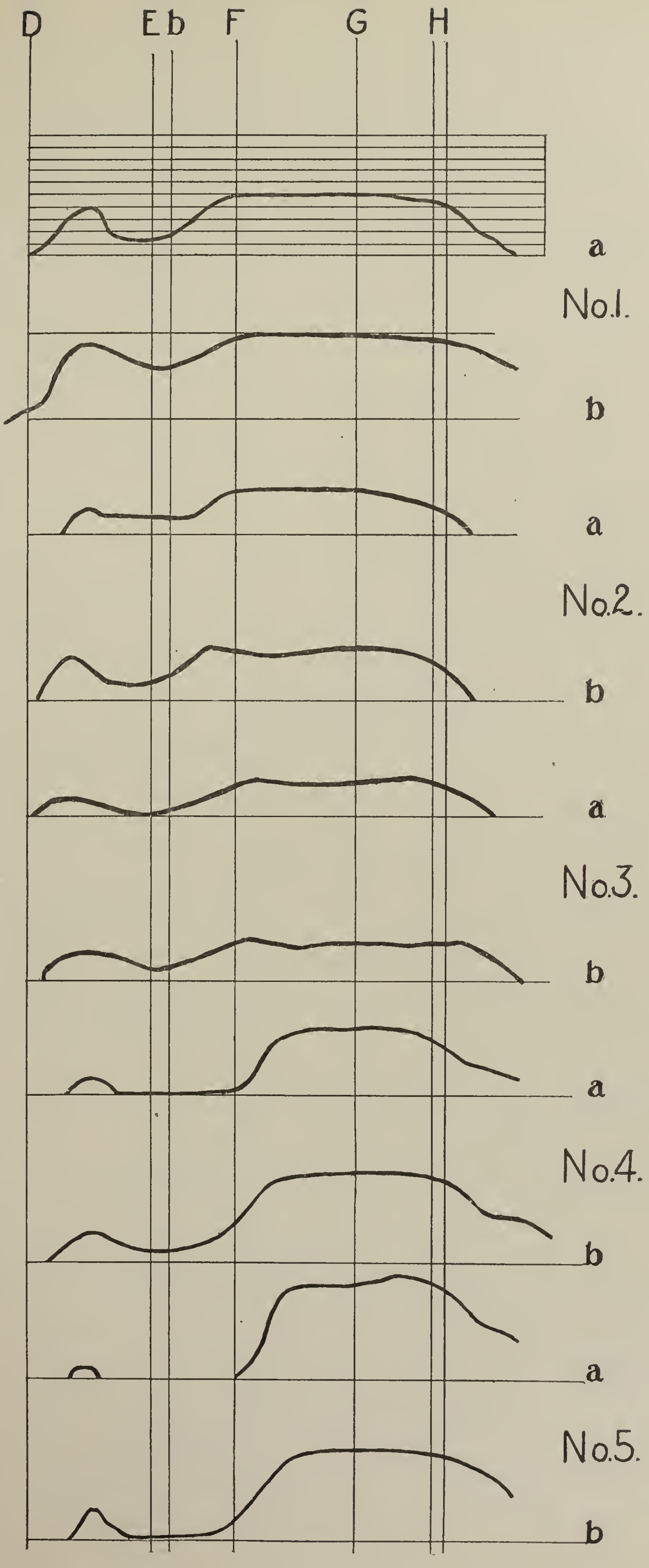
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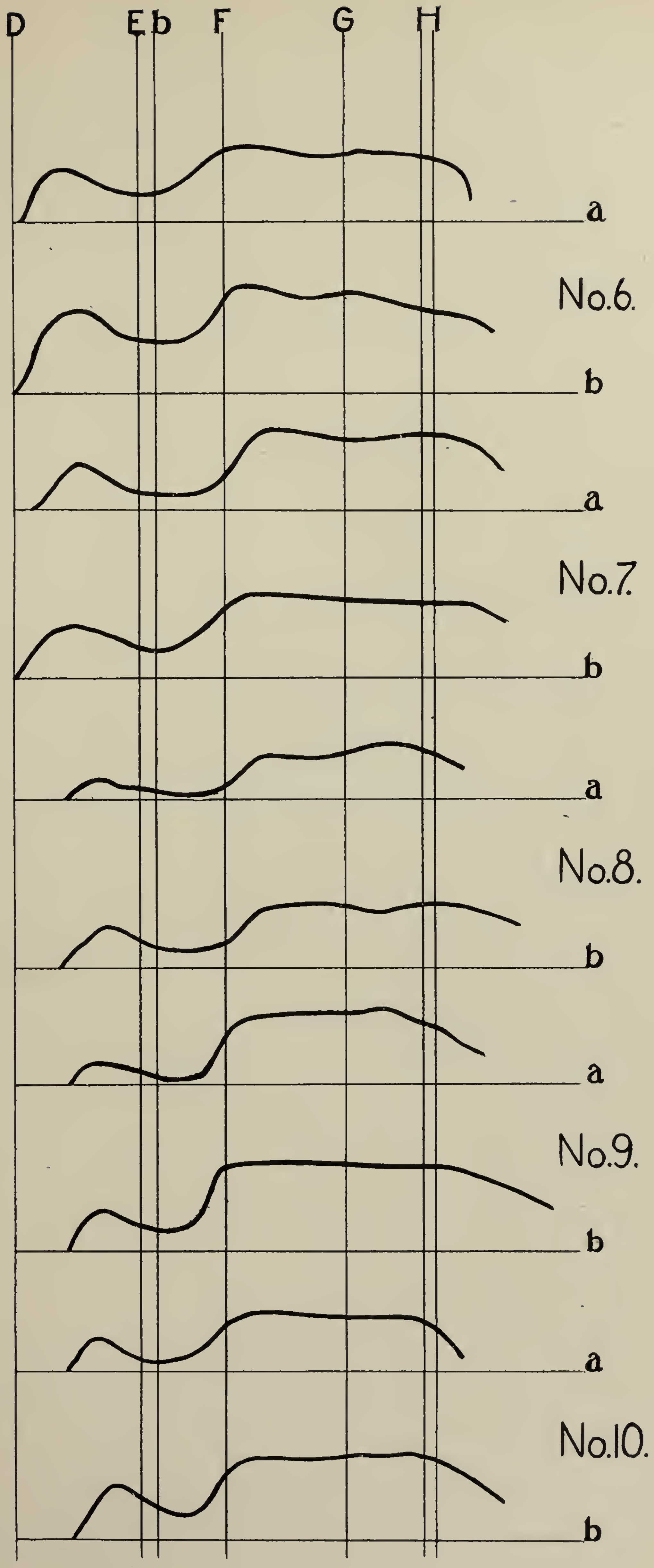
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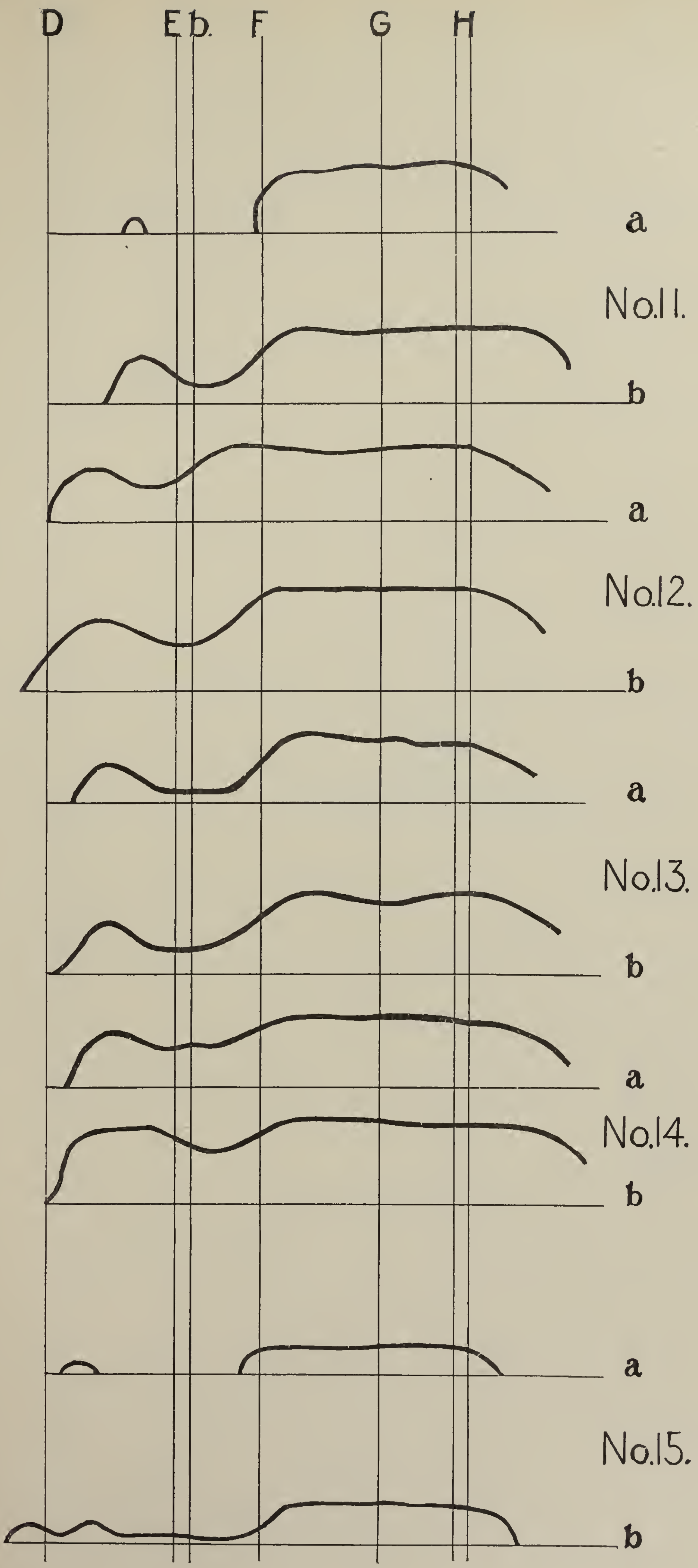
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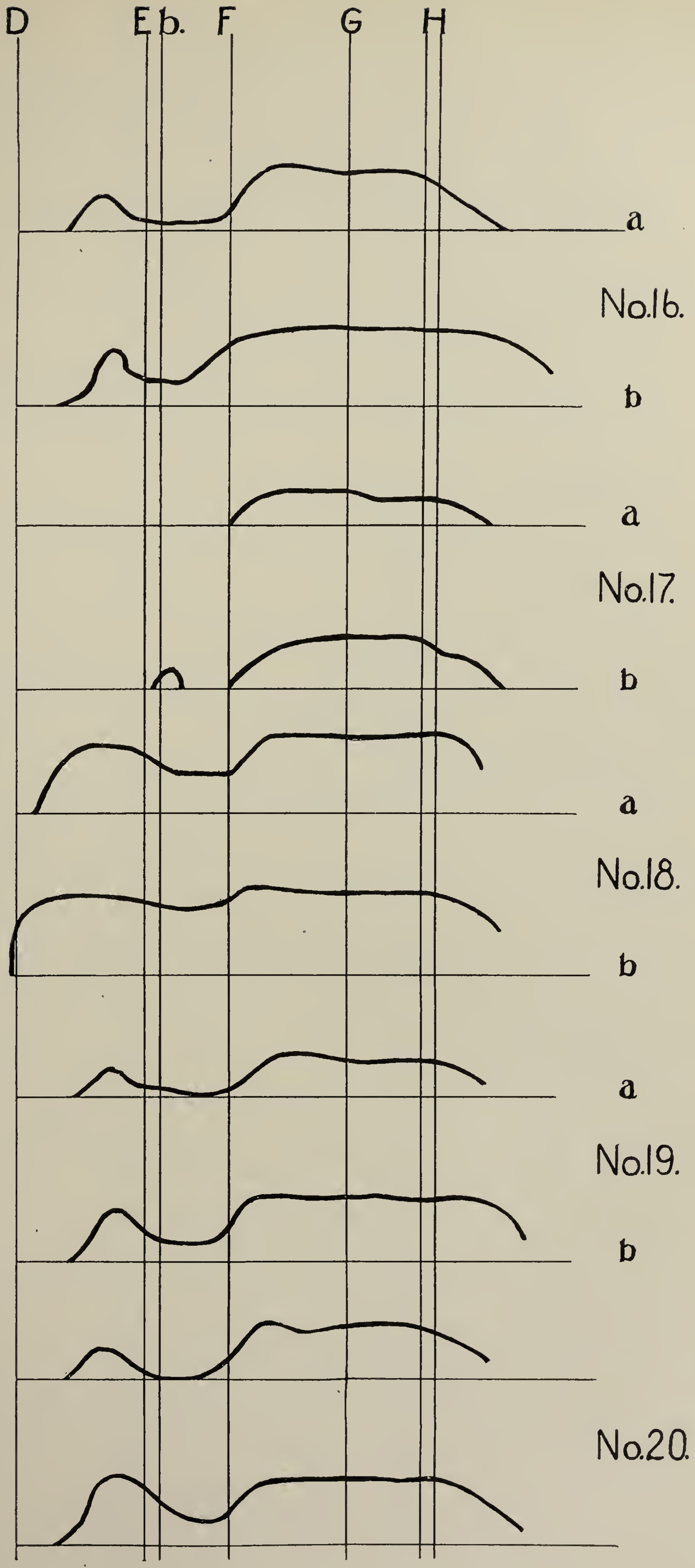
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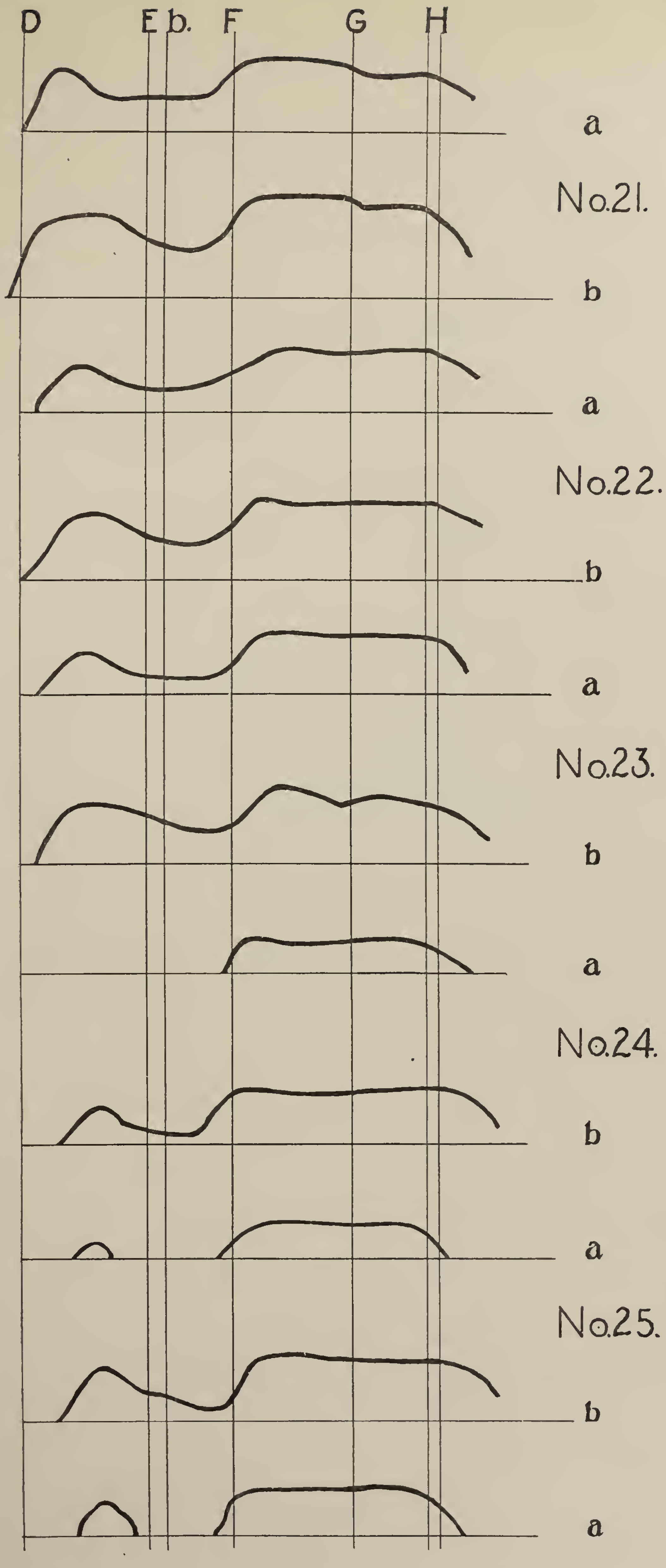
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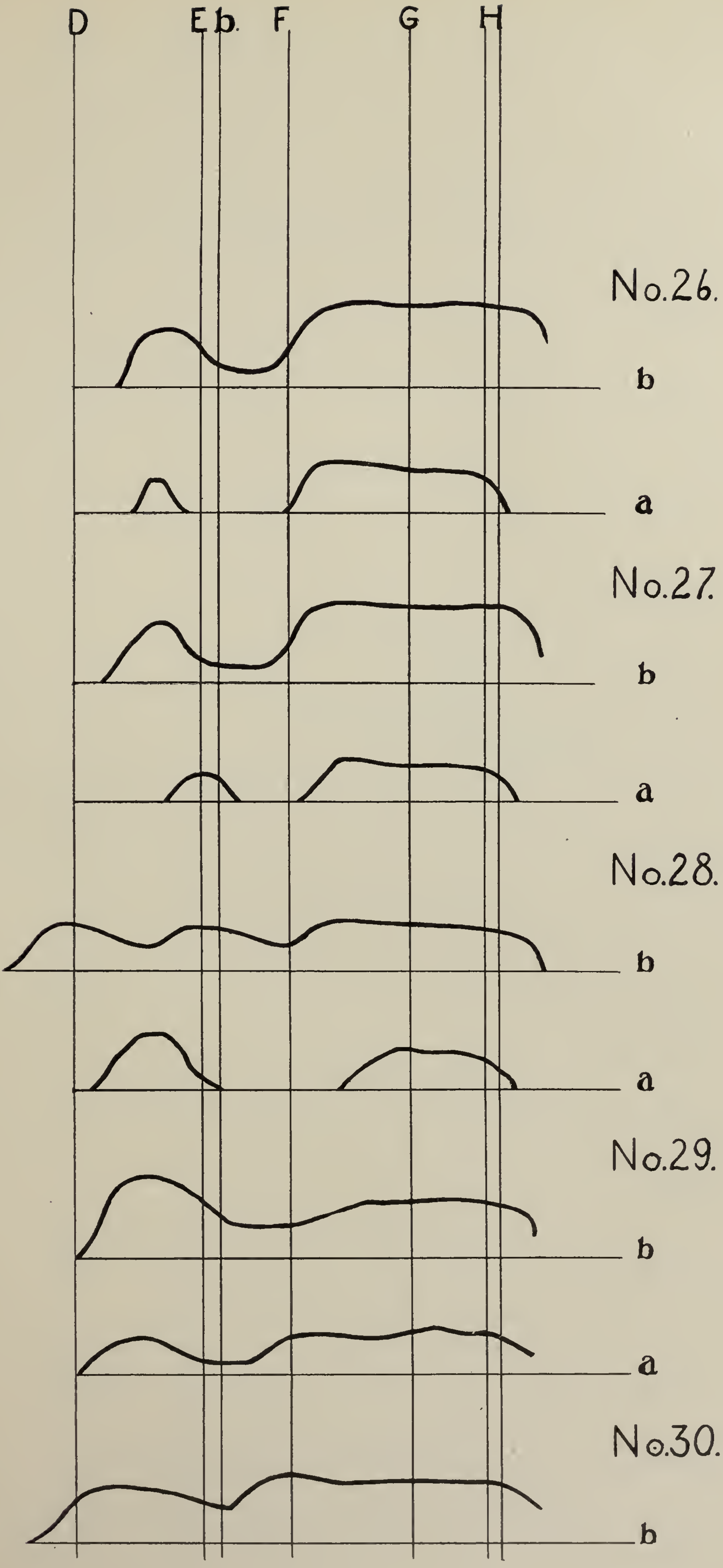
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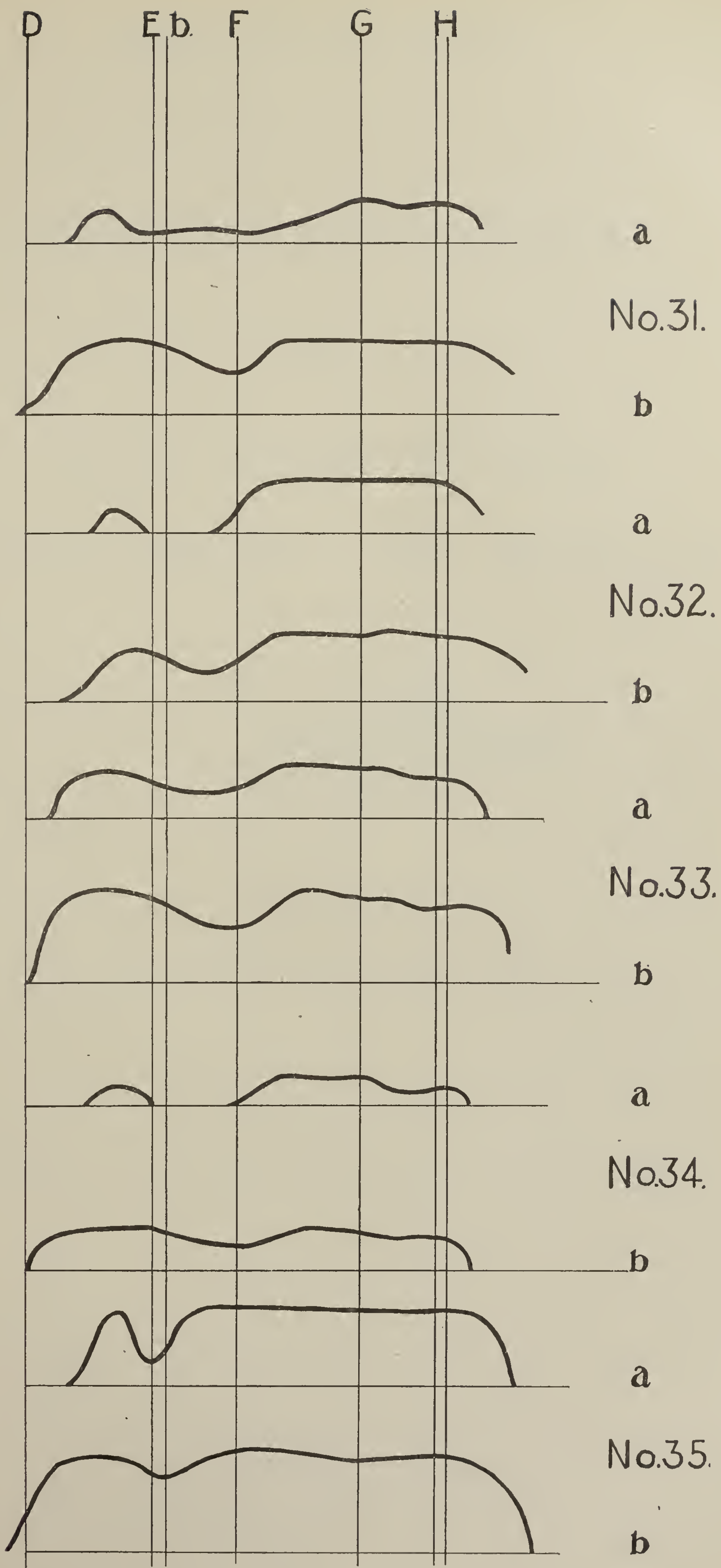
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FIFTH ANNUAL REPORT

OF THE WORK OF THE

CANCER LABORATORY

OF THE

NEW YORK STATE
DEPARTMENT OF HEALTH

Conducted at the
GRATWICK RESEARCH LABORATORY
University of Buffalo

For the Year 1903-4

TRANSMITTED TO THE LEGISLATURE APRIL 1, 1904

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1904

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REPORT OF THE DIRECTOR.

Buffalo, N. Y., *March* 17, 1904.

Dr. Daniel Lewis, *Commissioner of Health, Albany, N. Y.:*

Dear Sir.—I have the honor to transmit herewith the annual report of the Cancer Laboratory researches carried on under the auspices and by the aid of the Department of Health of the State of New York and in the Gratwick Laboratory of the University of Buffalo. The past year has not been characterized by any marked discoveries which can be safely announced to the world, but has been marked by steady, earnest and even laborious study along the lines of investigation, all of which are necessary and all of which are lending improvement in the study of cancer, either by chemical or biological means.

During the past year the staff of workers has included the following:

Dr. Harvey R. Gaylord	Pathologist.
Dr. H. G. Matzinger	Bacteriologist.
Dr. G. H. A. Clowes	Chemist.
Dr. Gary N. Calkins	Consulting Biologist.
F. S. Low	Assistant in Photo-chemistry.
W. S. Frisbie	Assistant Chemist.
Alice G. Owen	Assistant.
Clara A. Maclay	Secretary.
F. A. Payne	Janitor.
M. Weber	Laborer.
E. Kempkes	Laborer.

A portion of this time has been spent by Dr. Gaylord in Europe. Inasmuch as he was not working entirely in the interests of the Laboratory his salary was proportionately reduced. He has taken advantage of his presence in Europe to attend regularly the meetings of the Royal German Cancer Committee, of which, with myself, he is a member. He went to Copenhagen in the interests of the Laboratory to investigate the work of Jensen on the transplantation of carcinoma in mice. Professor Jensen was kind enough to give Dr. Gaylord some of his mice, which were brought to the Laboratory and used by Dr. Gaylord for the continuation and elaboration of the transplantation problem. A report from him is transmitted herewith. I also transmit herewith a paper by Prof. Gary Calkins, in which he has paved the way for still further announcements, of whose importance when made there can be no doubt.

One feature with which our study is more and more concerned is the variation of tumors of apparently the same general type, which are found to vary more and more, as do the personal features of different individuals of the same family. So marked is this variation that it becomes often confusing and makes it not only difficult to assign given specimens to their proper positions but even to indicate their relative degree of malignancy. Special attention has been given for the last few months to the study of tumors of the breast, in which Dr. Matzinger has been leader, and along the lines on which important theories have been advanced by Creighton in his remarkable new work entitled "Cancers and Other Tumors of the Breast."

The principal work of the chemical department in the course of the last year has been devoted primarily to the solution of the problem of obtaining immunity against cancer. Horses are being employed to prepare sera for use in incurable cases. Work of such a nature necessarily extends over long periods of time, and it will be impossible to give any final reports on this work in the immediate future. Experiments having a similar object in view are also in progress, making use of cancer mice kindly placed at the disposal of the Laboratory by Dr. Jensen of Copenhagen.

A great part of the time of the Laboratory staff has been devoted to work of a routine nature, several hundred analyses of stomach contents, urine, etc., having been carried out for the purposes of diagnosis. In several cases in which nutrition of patients has been seriously impaired systematic analyses of food and excreta have enabled us to materially improve their condition.

A part of the work undertaken by Dr. Clowes has been the chemical testing of the various staining fluids and materials used in order to better appreciate their reaction upon the cells constituting tumors, a subject on which there is much yet to be learned which will prove of value.

From the papers incorporated in this report and the abstracts of those published in the course of the last year in other journals, it will be seen that a considerable amount of work has been accomplished bearing on the physico-chemical problems of metabolism, the solution of certain micro-chemical problems and work of a serum-therapeutic nature.

The study of cancer everywhere provokes universal interest, evidences of which are seen in the increase of the activity of the medical journals devoted to this topic. A recent number of the British Medical Journal was almost exclusively devoted to the subject. There is now published in Germany, under the auspices of the German commission for the study of cancer, a *Zeitschrift für Krebsforschung* devoted exclusively to the subject, of which three numbers have already appeared. It proves to be a journal of great value. Such widespread activity is manifested in these various ways as to indicate the importance of this study to humanity.

In the last annual report I submitted a paper which had to do with applications, especially of the X-ray, in the treatment of cancer. In this paper I took the stand that it was too early to undertake to report results or do anything but gather material and watch. Now, a year later, I hardly feel justified in making any different statement, since while a large amount of material has been gathered and while men have watched eagerly, reports are so confusing and results so variant that it is still difficult to form a judicial estimate of their actual value. Recurrence has taken place in a few of the instances previously reported as cured and the whole question is still *sub judice.* I have had it in mind to summarize in a similar manner the subject of radiotherapy, but here the same confusion prevails. Opinions regarding this subject are discrepant. It is usually those who favor the use of the treatment, or those who have taken it up as a fad, who write the majority of the articles. Men who have been disappointed in its use or who have never become converted to it generally keep silent, and so their views are not heard.

Treatment of superficial growths by liquid air constitutes a method much more tangible, and, in some instances at least, promising. The conditions surrounding the method, however, make it impracticable.

Herewith is submitted a table, arranged by months, of the deaths occurring from cancer in the State of New York as taken from the Monthly Bulletin of the Department of Health. It shows an increase of about five hundred: that is to say, ten per cent, over the total number the previous year. How this figure can be explained on any basis other than actual increase I can not see. Certainly diagnostic methods have not so far improved within the year as to account for any such augmentation as this. It constitutes a rather startling corroboration of the estimate and even the prophecy contained in my first annual report of five years ago. I do not know what stronger argument could be advanced in favor of public assistance for the study of this disease than these figures furnished by disinterested observers.

TABLE I.

December, 1902	458
January, 1903	467
February	422
March	478
April	453
May	429
June	450
July	463
August	470
September	475
October	456
November	415
Total	5,436
For the year ending December 1, 1902	4,984
Increase	452

Below is submitted in Table II, a statement of the expenses of the Laboratory arranged as heretofore.

TABLE II.

Expenses of Conducting the Laboratory for the Period from October, 1902, to October, 1903.

1902.	Equipment.	Stock and material.	Sundry expense.	Salaries.	Total.
October	$100 81	$58 76	$90 15	$728 33	$978 05
November	97 48	195 95	105 54	762 33	1,161 30
December	40 10	95 91	224 48	809 83	1,170 32
1903.					
January..... ...	102 51	102 92	119 31	790 33	1,115 07
February	42 63	193 19	396 07	1,040 32	1,672 21
March	208 79	158 41	180 40	873 66	1,421 26
April	36 38	56 82	145 17	873 66	1,112 03
May	9 12	58 93	155 68	873 66	1,097 39
June.	49 78	39 51	399 08	873 66	1,362 03
July	179 66	37 14	326 49	706 99	1,250 28
August	2 50	7 04	123 37	694 99	827 90
September	384 02	23 60	27 44	700 04	1,135 10
	$1,253 78	$1,028 18	$2,293 18	$9,727 80	$14,302 94

Of our appropriation of $15,000 for the year 1902-3, $651.32 was used before October 1, 1902, on account of the change in the fiscal year which made it necessary for the previous appropriation to stretch over twenty months; and we had on hand October 1, 1903, $45.74, which accounts for the full $15,000.

With regard to the needs of the Laboratory for the ensuing year, I can only say that it is contemplated to carry on the work about as previously. The appropriation heretofore, i. e., $15,000 per annum, just enables us to do this work, and I would respectfully urge a continuation of the appropriation of the same amount for the continuation of the work during 1904-5. I have observed no falling off in zeal and interest among those engaged in the work; on the contrary, each one connected with the institution has shown such a degree of interest and faithfulness as to be entitled to much public commendation. As before, I have to thank you again for the unfailing assistance which has been constantly rendered from your department and for the numerous evidences of your own personal interest and appreciation of the work done in Buffalo.

ROSWELL PARK.

THE CELL-INCLUSIONS IN CARCINOMA.

By Gary N. Calkins, Ph. D., Professor of Invertebrate Zoology, Columbia University, N. Y.; Consulting Biologist State Cancer Laboratory.

It is not my purpose in this report to drag in again the arguments for and against the parasite theory of cancer, nor to dwell upon the lines which such arguments have taken in the past fifteen years. My subject deals rather with the miscellaneous inclusions found in cancer cells and leads me to offer still another contribution to the already crowded literature upon the subject of these much contested structures. I do so not with the hope of saying a conclusive word upon this difficult topic nor of formulating a theory as to the aetiology of cancer, much less of announcing a "new cancer organism," but solely for the purpose of showing how these inclusions may be regarded by a student of cellular biology who has given particular attention to the structures of the cell as they appear in normal tissues and in the lowest animal forms.

It may be pointed out that biologists as a rule have given but scant attention to the cancer inclusions, the majority of them passing over the subject with little thought, or with some evidence of arrogance dismissing without study the characteristic structures as "more like technical artefacts than organisms." There has grown up, however, a great literature on the subject of organisms, especially protozoa, in cancer, most of which, to be candid, is unquestionably based upon a meagre knowledge of these lower forms of life. Assertions and generalizations have been made which not only betoken ignorance of protozoön morphology, but owing to their indefinite nature invite criticism from the biological side on the one hand and scepticism from the pathological side on the other.

The main contention which some writers have held that the inclusions are protozoa has been weakened by false analogies and comparisons and the facility with which such comparisons have been overthrown has discredited the majority of such attempts. On the other hand, a biologist attempting to interpret the varied structures in cancer cells invites the same form of criticism from the pathological side, and basing his conclusions on morphology alone, runs the risk of making equally false and unjustifiable assertions and generalizations. It is with the full conviction of this possibility of error that I offer in the following pages a critical review of the structures which I have independently observed during the time that I have been connected with this Laboratory.

Contrary to what appears to be the usual custom in studying cancer-cell inclusions, I have not examined a large number of tumors in support of any particular hypothesis. On the whole it seemed to me more profitable to study in detail a single case and to be familiar with all of the types of inclusion which that case might present. The advantages of this procedure are: (1) It makes possible the attempt to work out the relations of the different kinds of inclusions, to grade together those which are undoubted degenerations or secretions, and those which may be otherwise interpreted. (2) It presents all of the inclusions under the same conditions of the disease. (3) It permits a deeper analysis in a given time into the structural modifications of the particular type of cancer cells under observation. (4) It gives by reason of this more detailed study a better basis for comparisons with the inclusions in other types of tumor.

Although I have examined many different types of tumor more or less carefully, the one which I have studied in detail is designated as case 300D in the Laboratory records. It was a rapidly growing carcinoma of the breast, operated by Dr. Roswell Park in June, 1903. The report of the pathologist upon it is as follows:

On examination the tumor proves to be a soft solid carcinoma of the breast, in many places showing a distinct cystic character. The larger cystic cavities are lined with multiple layers of large epithelial cells, the nuclei and protoplasm of which stain deeply with haematoxylin-eosin. Karyokinetic figures are fairly frequent. In the smaller nests the membrana propria of the ducts is broken through and nests of epithelial cells can be found in the connective tissue. Many of the canals are filled with solid masses of epithelium. The stroma is well developed and shows a moderate round-celled infiltration. The larger cystic cavities contain a coagulated secretion. In some places the epithelium presents characteristic papillary growths protruding into the lumena of the canals.*

It is the experience of all cytologists that the finer structures of the tissue cell such as centrosomes, spindle fibres, protoplasmic network and the like, can be satisfactorily demonstrated only when the tissue is fixed at once after removal from the body. By such immediate fixation the parts of the cell are set or coagulated by the fixing fluids before they have much time to change. Such changes are indicated in poorly fixed tissues by shrinkage of different parts of the cell and by the impossibility of demonstrating the various structures. Thus the cytoplasm appears shrunken away from the nucleus; the chromatin in the latter disintegrates while the nuclear membrane appears wrinkled and abnormal. In such cells it is practically impossible to demonstrate complete division figures, the spindle-fibres and centrosomes of the mitotic figure being indistinguishable, while the chromosomes are massed together in formless bulk. Conversely a good test of fixation and of stain is the clear demonstration of each of these parts of a dividing cell. If every spindle fibre is clearly defined, if each chromosome stands out sharply and distinctly, and if the centrosomes appear in their proper places as minute deeply-staining points, while in resting cells, if the nuclear membrane appears full and even, with the accompanying cytoplasm free from vacuoles, then the observer will have material from which he may confidently hope to get results.

It is not easy to get this perfect fixation in epithelial cells, but it is far more difficult to get good results in the structural details of the cell-inclusions. Notwithstanding their unicellular nature even protozoa are difficult to fix properly, as any one can testify who has attempted to fix *Amœba proteus* for example, with its pseudopodia extended, yet it can be done by using proper precautions, and it is equally possible to demonstrate structure in the cancer-cell inclusions. In my opinion the so-called "Plimmer's bodies" or "birdseye" inclusions are but poorly fixed bodies, the structures of which are masked because of poor technical methods.

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*Dr. Gaylord.

Every precaution was used in the treatment of case 300D (cf Figs. 34 and 59). Immediately after removal the tumor was brought in a hot box to the laboratory not 100 feet away, and long before the surgical details in the operating room were concluded, it had been cut into small pieces and distributed among several fixing agents. These included the fluids which have been tested by cytologists and recommended for their power of penetration without distortion. Zenker's fluid, Hermann's fluid, sublimate-acetic, picro-acetic and saturated sublimate were used, the best results being given with the first two. Among the stains used were Heidenhain's iron-hæmatoxylin, Delafield's hæmatoxylin, and Feinberg's stain, all of which gave passable results, but none of these was as satisfactory as the Romanowsky stain of polychrome methylene blue and eosin, nor as the magenta, picric-acid and indigo-carmine stain of Borrel (1901).

A. CRITICAL EXAMINATION OF THE CELL-INCLUSIONS.

The interpretation of a given cell-inclusion in carcinoma can be accurately given only by the genetic history of that inclusion. Hypothesis may follow hypothesis regarding it, but until it is followed out stage by stage the inclusion must remain a puzzle. It is fully as important to get the consecutive steps in the formation of a cell-inclusion as it is to get the series of changes in the life history of some unfamiliar animal, and inclusions in carcinoma will be a source of trouble until this is done for every type found.

Many of the inclusions in carcinoma have an encapsuled appearance due to the presence of a more or less thick membrane separating the inclusion from the cell protoplasm. Others are naked in the protoplasm and, if fixation is imperfect, they are apparently suspended in a vacuole. Secretions, degenerations of portions of the cell, metaplasmic products and the like are naked, and so also are intra-cellular parasites in trophic phases. The great membranes or capsules seen in so many cases are in all probability due to the reactions of the cell protoplasm to foreign bodies and not a portion of such foreign bodies, and the problem of such inclusions may be limited to identification of the contents of the capsule. No such capsules appear in the known cases of intra-cellular parasites, possibly because the protoplasmic reaction which produces the capsule is not called into action, possibly because of some emanation from the parasite which prevents its formation, for it may readily be seen that such a wall would be detrimental to the life-processes of a parasite by shutting off the food supply, walling in waste products and the like. So too the capsule which may form around a foreign body not a parasite; e. g., a blood cell, may cause the disintegration of such a contained cell by similarly keeping out food and keeping in waste products. We may state as a general principle regarding cellular parasites that no living parasite while performing its ordinary vegetative functions within a cell host is separated from its source of food supply by a capsule. A capsule may be formed, however, by the animal parasite itself during its reproductive phases, or the reproductive bodies such as spores may be protected temporarily by such capsules, while after the parasite is dead a wall may be built around it by the cytoplasm of the host cell. This capsule about these carcinoma inclusions then may be used as a convenient morphological element for distinguishing certain histogenetic products within a cell from the metaplasmic products of the cell or from intra-cellular parasites. It may define one type of cell-inclusions, while the absence of a capsule may involve further analysis. If the inclusions are cellular in nature, i. e., provided with nucleus and cytoplasm, they might well be regarded as parasites; if colloidal or uniformly granular, or otherwise specifically characterized, they may be regarded as products of the cell. Obviously, so far as demonstrating the parasitic nature is concerned, the capsule furnishes only negative evidence and the real difficulties in interpretation come in distinguishing products of the cell from non-encapsuled invaders.

Applying these considerations to the inclusions in carcinoma we find that this differential is of value in the interpretation of many of the structures observed. We note the presence of the capsule about cells which, despite their positions within other cells, may be more or less easily identified as leucocytes, or lymphocytes, or other tissue cells which in one way or another have come to be intra-cellular foreign bodies. We also find the capsule about inclusions which are not thus easily recognized, which show no indication of an original blood-cell structure, but by reason of the capsule about them we may conclude that they are derivatives of such invading cells. This conclusion for any specific case is strengthened by reason of more or less definite intermediate stages. On the other hand, there are innumerable inclusions which do not show the capsule and which have an entirely different appearance from the original cell-invaders or their derivatives, and which may be interpreted in some other way. The presence or absence of a capsule thus seems to offer a purely artificial but a convenient way of attacking the manifold structures which have been described again and again as the "cell inclusions in carcinoma."

I. THE ENCAPSULED FORMS.

The thickened rim or capsule about this type of cancer-cell inclusions is a good example of a widely spread protoplasmic reaction. A foreign granule under an oyster's mantle causes local irritation and secretion, resulting in the formation of a pearl. Many insect eggs cause local proliferation of vegetable cells and the formation from those of a thickened coating and other similar phenomena will suggest themselves. While these cases are instances of multicellular reactions to foreign objects, the same kind of reaction may occur when objects are introduced into the protoplasm. A notable example is the thickening of endoplasm about the water in a contractile vacuole in amœba, the condensation resulting in the formation of a capsule similar in nature to the ectoplasm which surrounds the entire animal, and like this brought about by the protoplasmic reaction to the water. It is apparent that the wall of the vacuole in amœba is formed by the compression of the alveoli which make up the structure of the protoplasm of the amœba's body, for the diameter of these alveoli decreases from the endoplasm towards the rim of the vacuole where owing to the density the separate alveoli can no longer be made out.

The conditions of the capsule about a carcinoma cell-inclusion are very similar to those of the thickened protoplasm about the contractile vacuole in amœba. There is the same gradation in density from the very dense inner wall turned towards the inclusion to the outer, normal, cytoplasm of the cell. Ribbert ('91) called attention to the fact that there appears to be a double contour in this membrane and he interpreted it as a thickening in the surrounding protoplasm, but accounted for it by the supposition that when one cell becomes invaginated into another the cell membrane of the invading cell would appear like a capsule. The capsule according to this interpretation therefore would be a part of the invading cell. Other observers interpret the capsule as a condensation of the protoplasm in the invaded cell. This was Sjöbring's ('90) interpretation and it was accepted and confirmed by Sawtschenko ('95), by Ruffer and Walker ('93) and by many others. Sawtschenko observed that the protoplasm of the invaded cell becomes more and more dense as the membrane is approached until in the membrane itself the protoplasm is homogeneous and clearly defined.

The explanation of these capsules is not clearly apparent unless they may be regarded as the result of a protoplasmic reaction to a certain type of stimulus. It is difficult to see how the invagination of one cell by another can give rise to all of the structures provided with capsules in the cancer cells. Ruffer and Walker ('93) express the view that the invaginated cells, due to rapid growth and pressure in a small space, may take the form of a cigarette within its holder. A section of such a combination would show two circles within a circle. In the case of cells, one of which is invaginated within another, we might similarly find an outer membrane of the invaginated cell and two inner membranes, one within the other, belonging to invaginated cell and invading cell respectively, and we could imagine that the nucleus of the invading cell might be pushed to one side as shown in Fig. 20 while some of the nuclear structures might even be interpreted in this way. The difficulty comes, however, in interpreting the degenerated structures within these capsules. If nothing but pressure induces this invasion, what reason is there for the degeneration of the invader and not of the invaded?

The natural supposition would be that it is the latter with its displaced and compressed nucleus in which we should look for ill effects and not in the former. Nor does this theory account for the thickening of the membrane in what may be properly interpreted as inclusions which have been in the invaded cell for some time, nor does it account for the graded density of the plasm which Sawtschenko correctly recognized. While it is not improbable that some of the inclusions found in epithelial cells in carcinoma are invaginations, and that the membranes in such cells may appear like thin capsules, there is reason to believe that this interpretation is too limited to account for all the inclusions with capsules of varying thickness.

Many of the cell-inclusions have no evidence of epithelial cell structure and may be recognized without much difficulty as leucocytes or lymphocytes, etc., and the capsules about them are well-defined and conspicuous (Figs. 2, 3, 5, 19, 20). The possibility of leucocyte invasion is admitted by almost every observer, and it is taken for granted by many that degenerative change of these invaders may give rise to many of the types of cancer-cell inclusions. Sawtschenko ('95) gave a very good review of the possibilities of such changes and described some of the modifications which follow upon invasion. Ribbert attempted to harmonize his theory of invaginating cells with this view by admitting that invagination in some cases might go so far that the invaded cell entirely closes over the invader, and he described the subsequent changes that the imprisoned cell might undergo; most of these, however, apply to the changes which leucocytes or other blood cells undergo and not to invaginating epithelial cells. Klebs ('93) undertook to explain the subsequent changes of invading blood cells on the supposition that they are digested by the epithelial cells which harbor them, and he maintained that many of the structures which other investigators took to be parasites were in reality only stages in the digestion. Without digressing too far to consider this theory, which begs the question of intra-cellular digestion on the part of epithelial cells, it is certainly unquestionable that any cell found within the protoplasm of another cell will, unless it is a parasite and adapted for this particular environment, be unable to continue its own living activities and will die, especially if prevented by a capsule from absorbing food or disposing of waste matters. Kleb's view that the cell is digested seems hardly necessary to account for the disintegration and degeneration which must follow as a natural result from the process of encystment. Whatever the agents are that bring about the degeneration it seems to be a recognized fact that such modifications of leucocytes and lymphocytes take place, and that the products are stored for a longer or shorter time in the protoplasm of the invaded cell.

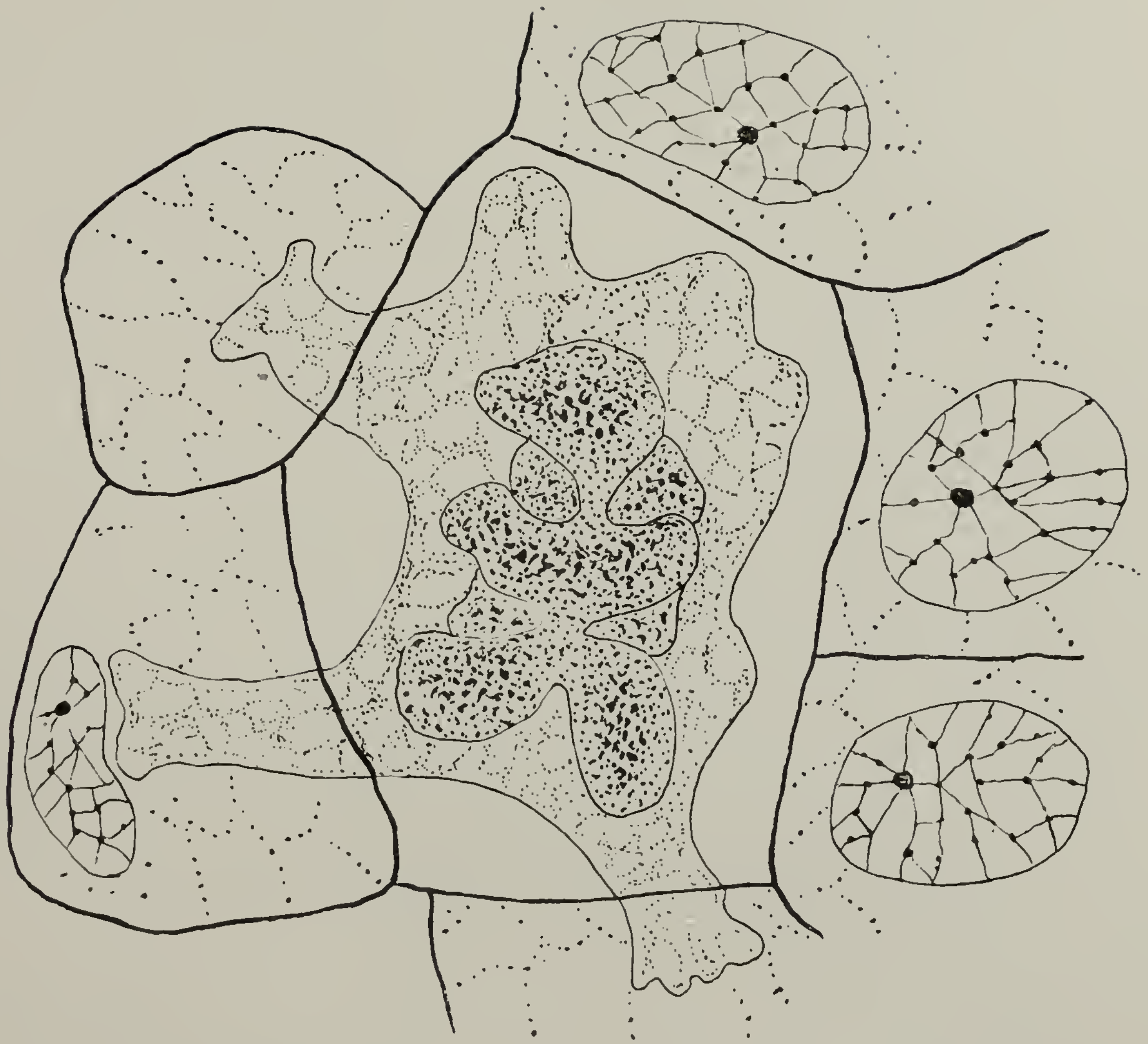
There is little doubt that a structure like that pictured in Figure 2, is a blood cell included in an epithelial cell, and incased within a capsular membrane derived from the protoplasm of the invaded cell. In these cases the original nature of the invading cells is retained and shows the specific character of the inclusion. The capsules are equally characteristic and are very different from the original cell membrane of leucocyte or lymphocyte.

With inclusions of the type represented in Figure 7, the specific nature can not be thus easily recognized and nothing remains except the capsule to aid the identification. This, however, is sufficiently characteristic to warrant the identification as a degenerated blood cell, and the conclusion is strengthened by the study of what are undoubtedly intermediate stages in the disintegration and degeneration of the recognizable blood cells. Here again the capsule plays an important part, for in cases which may be interpreted as later phases of degeneration the capsule appears thicker and denser than in the earlier phases (compare Figures 3 and 6). As Klebs pointed out the first changes which an invading cell undergoes are in the cytoplasm. This becomes " stringy " and incomplete through the appearance of great vacuoles (Figure 19) or it may be drawn out into strands like pseudopodia (Figures 21 and 23) or packed tightly about the yet unchanged nucleus (Figure 2). At a later stage the nucleus becomes modified; its reticular structure disappears, and it becomes compressed into a more or less solid spherical mass of chromatin (Figures 2, 5 and 21). A complete series of these modifications might be obtained without much difficulty from a single cancer, and a few of the characteristic forms assumed are shown in Figures 1 to 7, 16, 17, 19-24, 26 and 38. One important feature is the fact that the cytoplasm of the invading cell does not disappear; that is, it is not digested as Klebs assumed but persists and gives to the body within the capsule an appearance strikingly similar to an amœba, or to a spore of Plasmodiophora within its cyst. The nucleus in such forms varies considerably in size (cf. Figures 21, 22 and 23) and in some cases it apparently breaks up into granules as in Figure 6. Usually it is very much reduced and occasionally appears as a mere fragment of nuclear material within a mass of protoplasm which has no longer even the semblance of a blood cell. Finally this type of inclusion may be traced to structures like those represented by Figures 7 and 24, where hyaline degeneration has resulted in the formation of one or several structureless albuminoid masses with little or no resemblance to the former blood cell.

The earlier writers and observers were inclined to regard these various structures as sporozoa, especially coccidia. This was the interpretation put upon them by Strœbe, by Podwyssotzky and Sawtschenko, by Foa, by Metschnikoff and many others. Some, on the other hand, like Ribbert or Klebs, regarded them as products of degeneration. In addition to these there were still others who were uncertain as to the true significance of these structures, and did not attempt to place them. Among these was Soudakewitch ('92), who declined to place the inclusions which he was unable to identify as degeneration products in any group of animals or plants. Less conservative were Heukolom and Sjöbring, who abandoned the notion of coccidia in favor of the microsporidia, claiming that the inclusions are much more like the organism which causes pèbrine in silkworms than like coccidia. Part of Sjöbring's objection to the so-called coccidia of other observers was correctly based upon the fact that the apparent membrane around the supposed organism increases in thickness, and this he could not harmonize with a capsule formed as a cyst, a structure which, in other sporozoa, when once formed does not increase in thickness.

In reviewing the early work on these cancer-cell inclusions one is struck by the fact that the various degenerating cells of this type have played a most important part in filling in the stages in the "life-histories" of supposed parasites. The majority of observers have described forms of all sizes and shapes varying, as a rule, from 3μ to 40μ, the larger ones with solid and homogenous nuclei being almost invariably regarded as the adult form, and as these are usually found in many stages of disintegration, or as the capsule is frequently found with many structures within it, they were not infrequently interpreted as reproductive bodies ("the sporocysts" of many of the early observers cf. Fig. 7). In one case at least (Korotneff, '92) there appears to have been a confusion of large extra-cellular colloidal masses with these cell degenerations and with the minute bodies which subsequently became known as Plimmer's bodies or the "birdseye" inclusions. Korotneff's supposed organism, which he named *Rhopalocephalus carcinomatosus,* was regarded by him as a connecting link between the coccidia and the gregarines, and was endowed by him with characters of zoological as well as pathological importance. This called out immediate criticism from zoologists and pathologists alike, and the result is that Korotneff's "organism" enjoys the empty honor of a mere historical incident.

Before leaving this type of cancer-cell inclusions we must consider another very questionable organism, which, like Korotneff's Rhopalocephalus, is relegated to the waste pile of zoological genera and species. I refer to the remarkable structures which Eisen interpreted as living, independent amœboid organisms, causing carcinoma. I have reproduced one of these structures from Eisen's paper, and have searched for them in the tissues of the cancer which I have studied. It is difficult to prove that the bizarre cell-structures which I have found are identical with those described by Eisen, but as he maintained that the organisms were very common in cancers of this type I think there is no doubt that I have frequently seen what he means by his *Cancriamœba macroglossa* (compare text-figure and my plate II, Fig. 36). A characteristic feature is the "projectile snout" upon which Eisen bases the specific name, and which he regards as a pseudopodium with the specific function of food-getting. This snout, as he believed, presses into an epithelial cell like the suctorial tentacle of an acinetan and gradually digests the protoplasm of the invaded cell. The nucleus of the parasite is described as polymorphous and is frequently seen in the process of segmentation or fragmentation a process which precedes sporulation.



Copy of one of Eisen's figures of "cancriamoeba macroglossa" to show relative size of cells, "snout" etc.

Without going into details upon the subject of Eisen's interpretation of cancerous growths, and their relations to the supposed parasites, I may give a few criticisms of the supposed amœba, criticisms which are meant seriously since it is quite evident that Eisen's work was done in that spirit. The first point that strikes a student of the protozoa is that the protoplasm of the supposed parasite and that of the epithelial cells is almost identical in structure; the characteristic alveoli of amœba-protoplasm are conspicuously absent. As it is a cytophagous form food vacuoles in which the absorbed protoplasm from the host cells should be digested are always absent; there is no sign of ectoplasmic differentiation, the membrane around the supposed amœba is exactly the same as the membrane of an epithelial cell; contractile vacuoles, while not absolutely necessary for amœbæ, are nevertheless usually present, are entirely wanting in the form under consideration. (Note that in Schaudinn's Leydenia ('96) found in the fluids of peritoneal tumors a contractile vacuole is present.) The nucleus which Eisen fills in with structural detail is entirely different from the nuclei of any species of amœba with which I am familiar, for the characteristic marks of a rhizopod nucleus are large granular masses of chromatin or "chromatin reservoirs" suspended apparently in a nuclear fluid and surrounded by a very definite nuclear membrane. In the cells which I have found in carcinoma and which I regard as the same things that Eisen has described, the nucleus is exactly of the type as those of the surrounding epithelial cells, with the exception that it has lost its definite outline and appears hypertrophied, indented and polymorphic. The chromatin content of the nucleus is very different from that of a rhizopod, for chromatin and limin reticula are readily discernable.

Without attempting to demonstrate the histological significance of this type of structure, which appears to me simply a deformed cell through pressure in the epithelial plug, and undergoing hypertrophic degeneration, I may classify this supposed parasite as another case of mistaken identity which would have been avoided if the author had had a more thorough knowledge of the rhizopod organisms.

Quite a novel interpretation of this type of inclusion was given by Sawtschenko in his later and more important work in 1895. His observations were based upon well hardened and well stained material, and his conclusions regarding the larger cell-inclusions were similar in nature to those of Ribbert and Klebs, who saw in them only the remains of invading cells. Sawtschenko interpreted these inclusions as slimy or colloidal degeneration of cells or parts of cells, but he believed the material so formed to be the food-medium of real parasites of minute size and of varying form. The great majority of inclusions which had been described previously to his work he regarded as merely the scene of activity of the active, living inclusion, which in his earlier paper ('92) he had described as the "tadpole" form. In the later paper these forms were described as present in many different phases and his descriptions are so careful and his drawings so accurate that many of them might well be given to-day as a faithful representation of what is undoubtedly the most important and most interesting type of the cancer-cell inclusions. These inclusions, generally known to-day as Plimmer's bodies, or by von Leyden's term "birdseye" inclusions, have been the subject of contention between the recent advocates of the parasite hypothesis and their opponents. They are the astrospheres and centrosomes of Borrel ('01), the "cancer-parasites" of Bosc ('98), the "Plasmodiophora-like" bodies of Gaylord, the "Histosporidium carcinomatosum" of Feinberg, and the "intra-cellular secretions" of Nósske and Greenough, the Chytridae of Behla as well as the yeast-cell types of San Felice and others; in short, the controversy over the cancer-cell inclusions has been sifted down from the larger structures, which are generally recognized as degeneration products, to these minute inclusions first accurately described by Sawtschenko. The general form of the minute inclusions is that of the familiar Plimmer's body, a vacuole with an inclusion, which with inadequate hardening and staining methods appears homogeneous and usually without structure, thus leading to the misconception of the wall of the vacuole as the cell body and the contents as the nucleus of the supposed parasite. Sawtschenko maintained that the thickened capsule has nothing to do with the parasite save the limitation of the immediate environment, and interpreted the capsule inclusion as cell body plus nucleus. There seems to be little doubt that Sawtschenko confused some stages of degenerating blood cells, especially those forms with thickened capsule, with inclusions like the "birdseye" inclusions which should not be thus interpreted. Many of the cell inclusions of this type were observed by him to have no apparent structure, to be hyaline, and of the nature of colloidal degenerations; in short, the end stages of degeneration, and he suggested that such structures might be the degenerated remains of the parasites themselves and a condition to be expected if the inclusions are parasites, some of which might well be expected to succumb to the reactions of the epithelial cells. This keen observer therefore not only did much to clear the field of the speculative rubbish that had accumulated, but paved the way for future interpretations of the structures which are not to be interpreted as degenerating cells and over which the controversy of a cancer parasite must be fought. Before considering this type of inclusions more carefully it will be well to take up from a general point of view the inclusions which may be grouped together as the non-encapsuled inclusions.

2. NON-ENCAPSULED CELL-INCLUSIONS.

Among the inclusions of this type there are many possibilities. We may include under this heading the various oil or fatty products of the cell, local degenerations in cytoplasm or nucleus, metamorphosing products of nuclear origin, and metaplasmic modifications of various kinds as well as any intra-cellular parasites that may be present. The great difficulty obviously is to distinguish one from the other and any possible parasite from all the rest. On first thought this distinction between a possible parasite and products of the cell itself would appear easy to make on the ground that a parasite must be a complete cell with definite body and definite nucleus, whereas a cell product would be homogeneous and structureless. Unfortunately this is not true. Parasites may be present in which the nucleus is not a clearly defined structure of definite form and size but like the nuclear material of many primitive forms, such as bacteria and flagellates, may be distributed in the form of separated granules. On the other hand, normal structures of the cell may be present which, like the yolk nucleus of many egg cells, or the "Nebenkern" of many early sperm cells, or the "Chromidien" of many protozoa, are nuclear in origin and stain like chromatin, although in the cytoplasm. These are the things in short over which the controversy of the parasite in cancer is being waged and it must be admitted that the advocates of the parasite theory have much to contend with. Some of the inclusions, however, are difficult to interpret except on the basis of foreign organisms, and here we come to the necessity of discriminating between the structures which Behla has aptly termed the X-bodies, and the products of degenerating and invading cells. Let us first examine the other non-encapsuled cell-inclusions such as secretions, degenerations and the like.

A great many forms of cancer-cell inclusions appear homogeneous and without evidence of cellular structure, and might well be explained as degenerations of an albuminous nature. These are sometimes found in the cytoplasm and sometimes in the nuclei of epithelial cells, but wherever seen can be readily distinguished from the other inclusions. The possibility of inclusions being merely colloidal degenerations was pointed out by Soudakewitch in 1892, but the type was not emphasized until more recent times when Sawtschenko, Pianese, Fabre-Domergue, Hansemann, Nösske, Greenough and others have called particular attention to this possibility in connection with the contested inclusions.

It was pointed out by Sawtschenko and Pianese in particular that these colloidal matters may be formed from degenerating portions of the cell or nucleus, and figures have been given by each of these observers indicating the consecutive changes which the structures in question may take. The various *intra-nuclear* parasites of Thoma ('89), of Sjöbring ('90), of Soudakewitch ('92) and Ruffer ('93) were regarded as degeneration products of this type and the formation of chromatin masses of spherical form, vacuolization and changes in color reactions of the masses were described in detail. Such degenerations are common in the cancer which I have studied, and the figures of Sawtschenko and Pianese might have been duplicated many times over. They have also been found in the nuclei of skin cells in smallpox and in diphtheria and similar vacuolization and change in color reaction noted. They are, therefore, inclusions which all students of animal tissues are familiar with, and I may pass them over with the description of one or two. At the outset, as it were, of degeneration, these masses are homogeneous and stain uniformly. (Plate 3. Fig. 39.) Later the central part becomes less sensitive to the chromatin or basic dyes and gradually stains with the acid dyes; the peripheral portion of the mass, however, retains its staining capacity for a longer period and a somewhat shell- or capsule-like structure results. Still later the central portion becomes more disintegrated through vacuolization and may ultimately disappear altogether, leaving a hollow shell or a vacuolated or clathrate structure to mark its place inside the nucleus (Figs. 39-42).

In the cytoplasm similar homogeneous masses may also occur through the degeneration of a portion of the cytoplasm or by the degeneration of an invading cell, or possibly by "intra-cellular secretions." Such changes are known as normal processes in many types of cells which can not be correlated in any way with pathological conditions. Thus in the early egg cells of all types of animals where this subject has been investigated the first appearance of the later yolk material is in the vicinity of the cell-nucleus where it lies like a cap about the nuclear membrane. As the "yolk-nucleus" it has been described by many observers, and in all cases the staining reactions indicate that it is of nuclear origin. With growth of the egg this material becomes scattered throughout the cell body and changes in staining reactions. It ultimately becomes transformed into the comparatively large albuminous "yolk-plates" of the mature egg-cell. In secreting cells of many kinds similar nuclear extravasations have been frequently studied, and the process of chemical metamorphosis has been followed through the many grades of the nucleo-albumens from nucleins on the one hand to clear albumens on the other. In the secreting epithelial gland cells, especially those of the breast, it is to be expected that, if the same origin of the secretion is true, there should be masses of more or less albuminous matter stored in the cell body, and that this matter might show undeniable chromatin staining reactions. It would be expected that such masses might even take a uniform nuclear stain indicating a comparatively high percentage of acid content, or an equally uniform cytoplasmic stain indicating a high and predominating albuminous content, while it is equally to be expected that intermediate grades between the two should be frequently met with. Such inclusions are, indeed, common, and I think there can be little doubt that many of the structures which have been described as sporulating forms of coccidia or large gregarines are to be explained upon this supposition. Even the tadpole forms which Sawtschenko described in his earlier paper ('92) bear the evidences of this mode of origin. This type of structure may not be due entirely to secretions, in the epithelial cells with which we are dealing it may indeed be rare, but similar degeneration may take place in the nuclear material of invading cells which are undergoing disintegration. Thus we may account for structures like those represented in Figure 25, where peculiarly constructed bodies recalling Sawtschenko's "tadpole" forms are distributed about the interior of what appears to be the space occupied by an invading cell in aborted mitosis. This type has been interpreted quite often as a sporulating stage of some organism; e. g., by Soudakewitch, Foa, Metschnikoff, Sjöbring and others, an interpretation which Feinberg, without justification, modifies by considering it the "pan-sporoblast" stage of his microsporidian. In the figure referred to above, some of the contained bodies have a nearly uniform nuclear stain, others a uniform cytoplasmic stain, while in still others part stains with the one, part with the other. The forms assumed by the stained portion are frequently tadpole-like and perfectly homogeneous, and are not sharply demarcated from the remainder of the body. It is to be noted that all of this type of structure are characterized by the fact that the parts which stain with chromatin dyes are on the periphery, and in this respect they simulate the intra-nuclear degenerations described above. Ultimately this type of products of the cell take a uniform cytoplasmic stain and have an absolutely homogeneous appearance.

Still another form of inclusion is frequently found which evidently belongs to this type of colloidal products. These are usually much more fluid than those previously described and give the appearance of oils or fats in the cells. Pianese ('96) has shown the modifications which these inclusions may have, and it is possible to duplicate many of the forms pictured by him in the inclusions observed in case 300D. They are usually inclosed in an irregular area of the cell devoid of capsule-like thickening. The individual globules are of irregular size, probably, as Pianese suggests, due to the fusion of two or more. Figure 27 shows such a type and represents the apparent fusion of a smaller with a larger globule.

3. THE X-BODY.

The so-called X-body of Behla does not find a satisfactory explanation under any of the interpretations of degeneration, secretion, or metamorphosis, and in the cancer literature it has been gradually sifted out from the remaining cell inclusions as a form found only in cancer cells. It is the one type of inclusion which is now generally recognized by friends and enemies of the parasite hypothesis, as the strongest morphological evidence of that theory. It is found in many different phases in the cancer cells of carcinoma, and is the only inclusion in such cells that I have found which in any way justifies the belief on morphological grounds in a possible organism of cancer.

Before giving a review of the previous interpretations of this type of cell-inclusions I would like to describe some of the different forms which it assumes in the cancer which I have been studying. These different forms are so varied and comprise so many different features that at first glance they might be regarded as specifically different things. It is possible, however, to so arrange them that they form a fairly clear and logical set of morphological changes which, if one were so inclined, might be interpreted as growth and reproductive phases of an organism belonging to the unicellular forms. I do not wish to have my meaning misinterpreted in this connection, for there is no positive evidence of a parasite, no sequence in the tissues, and no way to tell, save by possible analogy, that any one stage precedes or follows any other, and to describe in sequence form is partly a matter of convenience, partly to show that such an arrangement is possible, but there is no intention on my part to claim that this sequence in any way establishes the parasitic nature of the inclusions.

In a great many forms of parasitic protozoa the young parasite begins its life as a minute homogeneous spore-like organism with no trace of structure. This is the case in the vaccine organism or young cytoplasmic parasite of the smallpox organism, and the spores of some of the microsporidia which are too small to show the characteristic microspore structures. So in the cancer cells there are minute bodies scarcely a micron in diameter which stain intensely with the specific chromatin dyes (methylene blue, magenta, etc.). These may be the same thing as the so-called Russell's bodies, although I have not observed that they have the characteristic fuchsine reaction which is claimed for these structures and they are much smaller than the forms usually described. They are perfectly homogeneous, sometimes surrounded by a minute vacuole, again with no space about them (Figures 9-10). They are the smallest inclusions that I have seen in cancer cells (less than one micron in diameter), but it is not impossible that still more minute bodies precede these and that more careful technical methods might demonstrate some structure which is certainly not obvious in the preparations as usually made. In slightly larger bodies, equally destitute of membrane or capsule, those for example measuring from 1.5 to 2 microns, there is evidence of differentiation, a minute unstained portion appearing in the body of the inclusion (Figure 10). If we were following the history of an unquestionable organism we should say that the stage following upon the one just described would show a further differentiation of this homogeneous material and that, like a spermatozoon, a portion of the original chromatin-staining substance remains as a nucleus while a peripheral portion forms a more or less clearly defined cytoplasmic or body portion. If this interpretation of these homogeneous bodies were true and if the development proceed as indicated, then the typical Plimmer's bodies might be explained as the immature organism arising from this spore-like germ. It has a definite cell body and a definite cell nucleus, and lies in a characteristic vacuole which always occurs about a foreign body in living protoplasm. In Figure 11 there are two of these forms lying side by side, each is a perfect cell and each is in the form of a minute sphere, measuring 2 and 2.5 microns in diameter. In these particular figures the body of the cell is not drawn out into processes connecting the inclusion with the walls of its vacuole, and this is the usual condition pictured for a typical Plimmer's body (Fig. 8). In the great majority of cases, however, in the preparations which I have studied the inclusion is in connection with the walls of its vacuole by protoplasmic processes which are strikingly like pseudopodia of a myxospore rhizopod-like sporozoon (e. g., Lymphosporidium). The minute bodies are devoid of ectoplasmic modifications and are homogeneous and granular in structure, more dense, however, than the surrounding cytoplasm of the epithelial cell. Occasionally a vacuole is seen in the cytoplasmic portion (Figure 14) but it is not common.

The chromatin-like granule in the center of these small inclusions is perfectly distinct, sharply outlined, and gives an entirely different appearance from the material stained with the chromatin dyes in the types of inclusion described as colloidal degenerations or secretions. It is not a residual color due to the incomplete extraction of the chromatin stain as is the case frequently with colloidal masses or oil-like inclusions, but is a chemically different substance with as definite an outline as a large chromatin granule in the nucleus. This clear definition is retained in all types of the inclusion; sometimes, however, the single granules are replaced by groups of equally distinct granules which may be collected in one group or distributed throughout the small body. With the Romanowsky stain these take the methylene blue, while the minute cell-body takes the eosin; with the Borrel combination the central granule remains red like the chromatin of the epithelial cells, while the cell-body stains green (Figures 12, 14-15, 19, 29, 31, 32, 33, 44-46, 48-51).

The groups of granules are not inconsistent with multiplicative changes in many forms of unicellular organisms. In the rhizopods especially, the nuclear bodies break up into granules by a process called fragmentation; these separate and become the individual nuclei of reproductive bodies. It is therefore a widespread phenomenon of the nucleus and a well-recognized process of division of nuclear material without any of the formalities of mitosis. It sometimes occurs in cases where mitosis is also present, as in *amœba,* where the nuclei divide repeatedly by mitosis until about one hundred are present in the cell, then the chromatin granules in each of the multiple nuclei breaks up spontaneously into small fragments, these escape by rupture of the nuclear membrane, and each fragment forms the nucleus of a spore. These instances serve to show that nuclear fragmentation without a formal process of division is to be expected in the type of organisms to which this cancer cell-inclusion, if it is an organism, may possibly belong. In the small nuclear granule of our form there are no division figures to indicate a mitotic process such as found in the dividing Plasmodiophora for example, but the granules are often seen in an elongated or irregular form, which might be expected in a process of fragmentation. The nucleus-like part of these inclusions is sometimes double, sometimes multiple, but always granular and not homogeneous or diffuse as in colloidal degeneration. The granules are frequently exquisitely minute, so small indeed as to baffle attempt at measurement; the nearest one can get to their size is the general statement that they measure the fraction of a micron, sometimes a large fraction, sometimes small. Whatever the size, however, they are invariably sharply outlined and clearly differentiated. There is never a nuclear membrane, the conditions being similar to the nuclear structures of bacteria or to the protozoon Tetramitus, or Lymphosporidium, or Cytoryctes variolae. Just as in these forms or as in the free non-parasitic types of rhizopods like foraminifera or like the amœba mentioned above the nuclear condition might well justify one in describing this type of inclusion in the cancer cells as a form with its nuclear material in the condition of numerous granular fragments indicating an approaching reproductive process.

It is in this condition of the inclusion, a condition which were we describing a free-living organism might be interpreted as the adult phase, that I have found some of the most interesting and most significant types of the cancer bodies. These are inclusions which give unmistakable evidence of independent protoplasmic movement within the host cells. The most impressive instances of this movement are those cases where the inclusion has been caught as if in the act of migrating from one epithelial cell into another (Figures 13 and 30). In these cases the nuclear material is sometimes in the form of a collection of granules grouped together in a single heap; again the granules are relatively few in number and widely distributed. In Figure 30 the amœboid form is in the act of leaving an intra-vacuolar position in one cell and appears to be penetrating the unaltered protoplasm of an adjacent cell; in Figure 13 a similar condition is pictured, but the connecting strand of material is so thin and delicate that we have the appearance of an indirect division of the inclusion. Indeed this particular case gives the only evidence that I have seen which might be interpreted as a process of division of the inclusion; the chromatin granules are equally distributed and the body is in equal parts. A figure like this, if observed in a free living form like amœba or actinophrys, etc., would be an unquestionable division figure. I have watched the entire process in a minute free form belonging to the genus nuclearia, have seen the pseudopodia drawn in, the appearance of the dividing furrow, the drawing out of the connecting strand of protoplasm and the final break at the center; just prior to the final break the appearance of the two daughter-organisms was strikingly like Figure 13 of the cancer-cell inclusion. It is conceivable that the structure here represented is merely a fragment of a leucocyte and I would be wary of calling it an organism until this possibility is shown to be unfounded.

Still other forms of the inclusions of this type are found in which there is an increase in the number of nuclear granules, each one being separated from all of the rest as in Figures 45, 46, 49 and 50, and occasionally I have found inclusions in which the material is broken up into fragments, each with a chromatin granule in it (Figure 47).

Not only do these inclusions appear in the cell-bodies of the epithelial cells, but they are also occasionally found in the nucleus where they appear to undergo a nuclear metamorphosis similar to that of the cytoplasmic forms. The vacuoles in this case are bounded by chromatin massed to form an apparent membrane which stains with the characteristic nuclear dyes. Several of these intra-nuclear bodies may be traced to metamorphosing chromatin of the nucleus, and there is little or no evidence that they arise by growth of an intra-nuclear spore-like germ. In one case (Figure 28) there are several homogeneous bodies just outside of the nuclear membrane, while two similar bodies are inside of the nucleus and are contained in a vesicle with a delicate wall. Other intra-nuclear forms have the same structure as the majority of the cytoplasmic inclusions, a central or excentric nuclear spot and a differently staining protoplasmic body. In many cases the inclusion appears to be either entering or leaving the nucleus, for the membrane of the latter is deeply indented and the inclusion is partly in and partly outside (Figures 12, 18, 52).

It is quite possible that all of the intra-nuclear forms of the X-body are merely stages in the metamorphosis of the nucleolus as described by Pianese (cf. p. 24). This would explain the chromatin spot and the membrane of chromatin. It might also be argued that the cytoplasmic forms of the X-body are merely the extruded remains of such degenerated nucleoli. The close connection with the nucleus in cases like that pictured in these figures might be cited in support of this theory, but there are so many cases of multiple cytoplasmic bodies, and so many cases where cytoplasmic bodies and nucleoli are both present that the evidence for the theory is outweighed by the evidence against it, while no such theory can account for bodies like those shown in Figures 13, 30, 52, etc.

The large inclusions which had been described up to the time of Sawtschenko, and which have been described by numerous observers since then, were interpreted by him as colloidal degenerations of cells or parts of cells, and a slimy medium was thus formed in which the real cancer-cell parasites found a good feeding ground, and in which they reproduced by the formation of spores of a general sickle-form. The usual inclusions which he described were only once found within the nucleus, the other intra-nuclear bodies which Sjöbring, Soudakewitch and others had laid so much stress on he regarded as degeneration products of the chromatin. His parasites were thought to be more like hæmatozoa than like any other parasitic form and to have a history somewhat similar to the life-stages of the malaria organisms. A nuclear granule was pictured in some forms, a group of such granules in others, while pseudopodial processes formed an irregular peripheral part of the inclusion. The membrane when formed was shown to be a condensation of the surrounding protoplasm of the epithelial cell and no part whatsoever of the organism. It may be seen then that Sawtschenko's observations as to the morphology of the parasite agree very well with the descriptions which I have here given of the

X-body in carcinoma. His material was taken from different kinds of tumors among which were several cases of carcinoma.

There have been many attempts to show that Sawtschenko's "organisms" are products of degeneration, or secretions, or other parts of the normal epithelial cell, but these attempted explanations do not carry conviction, and the failure to find similar things in other diseases, or similarly modified portions of cells in other tissues, goes a long way against such explanation. For the most part these explanations are based upon the possibility of degeneration, or upon some other fanciful change which the cancer cells might mysteriously undergo under the stimulus of unknown toxines or influences of the disease. There is absolutely no doubt that the cancer cells contain inclusions which can be interpreted as degenerations, others as secretions and so on, but in addition to these there are others which can not be disposed of in this way, and these inclusions which Sawtschenko described for the first time, are the forms which remain to be interpreted. An examination of the various attempts to explain them shows the inadequacy of the different interpretations thus far given. Among such attempts we may consider only (1) the astrosphere theory of Borrel; (2) the secretion theory of Nösske and Greenough; (3) the nuclear fragment and chromosome theory of Cornil, Hansemann, Pianese and others.

Borrel's hypothesis has not received much support, nor am I aware that it has been submitted to searching criticism, most observers who deal with the cancer-cell inclusions being content with a simple denial of the possibility. In the early germ cells of the testicles of different animals, especially in many of the vertebrates, the primordial germ cells (spermatogonia) and the maturing germ cells (spermatocytes) have large characteristic structures consisting, as a rule, of several parts, and which are known as the "centrosome" and "sphere" or, all of the structures together, as the "astrosphere." The material of the sphere gives rise in part to the substance of the spindle figure and, when these are present, to the rays passing into the cytoplasm. The centrosomes may in turn have a still smaller internal differentiation the "centriole" and it together with the other sphere substance called the "archoplasm," is supposed to be the center of kinetic activity in the cell. These highly complicated astrospheres are by no means universal in cells and are not easily demonstrable save in germ cells where division is frequent. In epithelial cells they are difficult to make out, although Ballowitz, Heidenheim and Zimmerman have described them in different kinds of epithelium. When present in the cell these spheres are not difficult to stain and are particularly clear and demonstrable when the cells are in active mitosis. At such periods of cellular activity the centrosome and sphere may be seen at the spindle poles, or at the periphery of the daughter nuclei, preparing for the next mitosis. In the resting cells they are conspicuous only in the germ cells or in the spinal ganglion cells of certain animals (dogs, cats, frogs, etc., Rohde). Here they are inclusions with a central spot and an irregular periphery rather sharply marked off from the surrounding cytoplasm but not separated from it by a capsule-like membrane. These astrospheres are the structures which Borrel would compare with the X-body in carcinoma cells, on what justifiable grounds it is difficult to see. Against this view it has been urged that if such structures are normal they would appear in all of the cells while their number would not be increased to twenty or more in any given cell as is sometimes known to happen with the X-body. It seems to me equally plausible to hold the view which Rohde ('03) has recently advanced, that astrospheres in the spinal-ganglia cells are parasites. Both Borrel and Rohde show that the supposed centrosomes divide or else undergo multiple fragmentation to form a group of centers (microcenter) inside of the archoplasmic mass. One (Borrel) interprets the similar division of the central spot of the X-body as equivalent to the fragmentation of the centrosome and regards the central spots as centrosomes. The other (Rohde) holds that the several divisions of the true centrosomes correspond to spores of a parasite. To the former it proves the centrosome nature, to the latter the parasite nature of the central body. To Borrel each part of the cancer-cell inclusion, like the divisions of a centrosome, has the power to form a new centrosome, but each of the divisions of the centrosome forms a new parasite, according to Rohde. To the pathologist the inclusion is a centrosome; to the cytologist, the centrosome is a parasite, and we are justified, I believe, in questioning the advisability of the one on this evidence to enter the field of normal cytology, or of the other to enter the domains of pathology. Borrel's contention can not hold, for the structure in question not only does not have the same history as a centrosome and sphere, but it has no evidence of the structure of this normal part of certain cells, nor is it found at the spindle poles during mitosis, nor at the periphery of the daughter nuclei after mitosis (see Figures 34 and 59). I know of no centrosome or sphere in any normal cell in which there is a like structure, and in cells where astrospheres are formed in large numbers through artificial means, e. g., treatment with magnesium chloride, and which therefore represent abnormal astrospheres of the cell, there is no trace of these peculiar differentiations which are found in the cancer-cell inclusions. In these the artificially created centrosomes and spheres are merely collections of cytoplasmic granules arranged in radiating lines and with a large central granule as centrosome (see Wilson, '02). Borrel's hypothesis then does not stand the test of comparison even with the centrosomes in the spermatocytes of the guinea pig as worked out by Meves, which he takes as his type for comparison, while Rohde's interpretation of centrosomes of this type need not be considered further in this place. It is a gratuitous assumption to hold that the multiple inclusions which are found in many cells in cancer are due to the division of centrosomes, and to explain it we must again draw upon the mystical resources of cancer cells, and to the action of the same unknown toxines that call out degenerations and secretions.

The extremely minute inclusions which have been found in cancer cells and which I have shown in Figures 9 and 10, have been frequently interpreted as minute bits of chromatin or as separated chromosomes. Thus Ruffer and Walker ('93) considered them in this light and agreed with the earlier work of Hauser ('90) in the belief that the so-called Russell's bodies are nothing but portions of the nuclear material which have been derived in one way or another. That there is some good basis for this assumption is indicated by the fact that chromosomes are frequently known to get separated from the nuclei in which they belong and to lead an independent existence in the cell protoplasm. Thus Juel showed that a separated chromosome forms a nucleus of minute size in the cell; it loses its homogeneous appearance in the same way that the chromosomes within the daughter nuclei do, and Juel showed that it forms a reticulate nucleus with chromatin network of the same type as the larger nuclei. Its ultimate fate was not followed. Similar isolated chromosomes have been studied by Boveri and others, and the possibility of such an origin here is not excluded.

Again, the nucleus frequently appears wrinkled and warty and minute protuberances which appear to be on the point of detachment are frequently observed; these are often parts of leucocyte nuclei, the structures par excellence for fragmentation. Figures 57 and 58 show the possibility of such an origin of certain of the minute forms in the cancer cells, and possibly other minute structures, which I can not interpret, may have such an origin (e. g., Figure 37).

Without denying the possibility of such an origin for many of the X-bodies, I do not think that the explanation covers all of them by any means. The origin from a chromosome or from a portion of the resting nucleus might explain the nuclear part of the inclusion, but it fails to indicate the origin of the cytoplasmic part, or the nuclear granulations and the general cell-like structure of the minute inclusions, or of the motile forms as shown in Figures 13 and 30. The inclusions are not like nuclei as described by Juel, but are perfect little cells, each with its minute granular nucleus and alveolar cytoplasm.

Several observers have attributed the X-bodies to secretions in the cell. Pianese, Hansemann, Greenough and Nösske all have a more or less definite conception of the process by which the secreted matter may become hardened or more dense and so give rise to chromatin-like portions. Greenough refers them to specifically modified protoplasm belonging possibly to the cellular structures which Prenant described, and according to whom the protoplasm of a tissue cell contains many kinds of "higher" protoplasm, quite unintelligible to the ordinary cytologist. Nösske interprets the

X-bodies as nothing but vacuoles in the cell which become filled with some kind of inner secretion which is capable of a coagulation process, through which the nucleus-like granules are obtained. In all of these cases there is the same uncertainty of the *modus operandi* in the formation of the questionable body; in each case there appears to be an *a priori* conception of how it might take place, but we search in vain for morphological light on the process. In the meantime the structures are there, definite, clearly differentiated, and of practically the same type, so that they are unmistakable. According to this theory their presence in the nucleus involves that organ of the cell in a new rôle, viz: a " secretion-receptacle," while the unmistakable signs of movement on the part of the inclusions will necessitate a new manifestation of mental agility on the part of the secretionists. My own experience does not enable me to picture secretions in these manifold rôles and in the varied positions, and until more positive evidence is adduced than the literature affords at present, the balance of the evidence must go against this interpretation also.

The X-body thus is not satisfactorily explained as a nuclear product, nor as an astrosphere or secretion. Can it be referred to degeneration products of invading blood cells? The form of the minute inclusion is similar to that of the stage in degeneration where the nucleus is compacted into a homogeneous sphere with cytoplasm in the form of pseudopodia, while the multinucleate condition is duplicated by fragmentation of the nucleus of the degenerated leucocyte. Late stages of the degenerating blood cell may be strikingly like some inclusions which might be mistaken for stages of the X-body. Thus Figure 16 and Figure 17 are very similar, and despite the absence in the latter of the enveloping capsule may be identical in origin. The inclusion shown in Figure 17 is apparently free and resting on two cells, and as it appears under the microscope it is not an intra cytoplasmic structure. This may account for the absence of capsule like that of Figures 16, 23, 38, etc. These are very different things from the more minute and delicate structures shown in Figures 12, 15, 18, 19, 31, 32, 44, etc., and I do not see how the latter can be referred to degenerating blood cells unless, indeed, they are mere fragments of leucocytes; they have no capsules, they are provided with definite chromatin granules and have a well-defined protoplasmic structure. It is an easy way out of a difficulty to say that such things are derived from degenerating tissue elements, and such statements too often given as mere dicta, can not advance the subject in any way.

It is equally unscientific to maintain on the evidence thus far obtained, that these things are parasites. As a working hypothesis, however, it is perfectly legitimate to interpret the various forms of the X-body as organisms quite different from any products of histogenesis. Thus Figures 13 and 30 represent a type of these cell-inclusions which the trained microscopist can not pass over lightly as degeneration products, secretions, or other ordinary cell derivatives. The definite contours, the brightly staining points of chromatin, the evidences of spontaneous movement, all tend to strengthen the hypothesis of a foreign intra-cellular organism. It is conceivable that the structure represented in Figure 13 has been drawn out by division of the cell, and that the connecting strand was not severed after complete separation of the daughter cells, but this seems hardly possible when we consider the age of these cells as shown by the nuclei and cell membranes. The cell plate forming between the daughter cells would certainly have ruptured the delicate connecting strand of the inclusion. The vacuole at the lower end, and the absence of the vacuole at the upper end indicate movement towards the latter.

Notwithstanding the many significant forms assumed by the X-body, I do not yet share the certainty of those who have felt sure enough of the parasite to give it a specific name and a specific systematic position in the animal or vegetable series. The wrecks of *Rhopalocephalus carcinomatosus,* of *Cancriamœba macroglossa,* of Sjöbring's *Strombodes,* indicate the dangers of such attempts, and Feinberg certainly takes great risks in giving to the X-body the specific name of *Histosporidium carcinomatosum.* Even though the X-body were an undoubted organism, which, by the way, is not evidenced in any degree by Feinberg's descriptions, there is absolutely no structural or ontogenetic evidence to justify its position as a sporozoon. There is not enough structural evidence even to place it definitely as plant or as animal and such attempts are premature. If on the evidence thus far advanced we were inclined to indicate relationship of the possible parasite, we would, with Behla, place it with the Chytridiaceæ, or with some other similar group intermediate between the lower plants and protozoa. Even were it proved to be an organism it could be accurately placed only after knowledge of the full life history, and the evidence even for simple reproduction by spore-formation, the possibility of which is barely indicated by structures similar to that represented by Figure 47, is not yet forthcoming. The difficulties of the problem make it the more fascinating, and the parasite hypothesis should not be deprecated or neglected because of the hasty conclusions which some of the advocates of that hypothesis have published. I am much more favorably impressed with the breadth of view of Borrel which prompts him to say: "The criticism which I have just made against the attempts to explain these inclusions as sporozoa should not prevent further research along the lines of this seductive hypothesis" (op. cit. '01, page 60), than with the dogmatism of Marchand when he says: "Since the theoretical considerations are totally opposed to the probability, and indeed the possibility, of a parasitic origin of carcinoma and other malignant neoplasms, and since all cell-inclusions which have been described as parasites are not such but are products of the cell itself, it is high time that pointless research for a carcinoma parasite should be given up and the cause of the malignant growth sought for in other ways."* Even though a specific parasite in carcinoma on *a priori* grounds seems untenable to some, the possibility that such is the case is at least conceivable, and this line of attack should not be neglected until the ætiology of cancer is established. But the *a priori* arguments which have been given are not sufficient to show that this theory is untenable, and the opponents of the theory do not take into consideration all of the possibilities of activity of living foreign inclusions.

Protozoa, like the bacteria, produce substances as products of their metabolic activity which are poisonous to their hosts, and give rise to malignant diseases. Malaria, smallpox, scarlet fever and the several types of disease caused by different species of the genus Trypanosoma owe their morbid effects to toxines of this cellular origin, and these affect the host in various ways, sometimes only physiologically, sometimes both physiologically and morphologically. The specific effect produced in carcinoma is the increased activity of cell division in epithelial cells leading to proliferation of these cells, to abnormal structures and to invasion along the lines of least resistance. The usual response of a lower animal to the intercellular protozoon parasite is the formation of an enveloping sheath or cyst due to accumulation of the connective tissue and called out by stimulus of the parasite. In some cases, however, there is a stimulus to division of the epithelial cells and unusual proliferation in the vicinity of the infection. Thus Thelohan, Hofer and Doflein emphasize the fact that Myxobolus-infection in fish results in the unusual proliferation of the muscle-cells; Leuckart called attention to the epithelial proliferation in Coccidia-infected rabbits, an observation which Tyzzer ('02) has recently confirmed. In vegetable protoplasms the effect of *Plasmodiophora brassicæ* upon plant tissue is the active proliferation of cells and the formation of great deformities in the roots. Proliferation therefore is a general phenomenon attendant on the presence of protozoon parasites.

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*Quoted from abstract in Centralbl. of Bakt. Par. 1903.

The objection has been raised that the supposed parasites in carcinoma are so few in number that they are totally inadequate to account for the active increase of the epithelium, and as a counter-proposition it has been urged, especially by Cohnheim, that the invading epithelium is a reserve of embryonic cells which have lain quiet in the body until the proper conditions bring out the latent energy and cause them to rapidly divide like young cells. I am not competent to discuss this theory, nor to criticize it from the embryological point of view, and for this reason the fact that it seems to me farfetched and improbable, will carry little weight. I am more at home in criticizing the recent view of Ribbert ('01), who makes the objection that if parasites are the cause of cancer they must have the very novel power of changing the entire nature of epithelial cells; that is, of generalizing them and of making them more perfect cells instead of more disabled cells, or that the parasites instead of exerting a harmful effect upon the cells they infest produce a beneficial effect. A satisfactory response to this kind of argument was made by R. Hertwig (1900), who called attention to the fact that cancer cells instead of being perfect or embryonic in nature, are actually the reverse and show unmistakable signs of senile degeneration. He called attention to the fact that in protozoa (Actinosphærium) after a long period of rapid asexual reproduction the cells become hypertrophied and abnormal in structure; the nuclei are much enlarged and show characteristic morphological changes which are due to protoplasmic senility. The fact that such changes are frequent in cultures of protozoa which have been kept from sexual reproduction for long periods has been known for many years, and old age in these single cells is a well-known phenomenon since Maupas' classical researches in 1888 and 1889. Hertwig's contention is that abnormal epithelial growths do not occur in the young human tissues, but make their appearance after cell-proliferation has become less active. In such cancer cells, the abnormal growth is a sign, not of youth with its well-balanced self-regulation which prohibits abnormalities, but of senility in which the self-regulating power so characteristic of all living things has been lost. Secondary evidences of this degeneration are shown by the hypertrophied nucleus, frequent amitoses and loss of the specific characteristics of the tissue involved. The problem of the ætiology of cancer deals with the direct cause of this special increase of the dividing energy of cancer cells.

An epithelial cell in an adult human being represents the Nth generation of cells since the first cleavage of the egg, and just as we are justified in saying that the 319th generation of Stylonychia pustulata, or the 200th generation of Paramœcium caudatum represent the limits of dividing energy of these two organisms, so we may say that the Nth generation of any tissue cells represents the limit of dividing energy in these human cells. In the case of Paramœcium, however, it has been shown that the waning energy may be renewed by artificial means, and that the addition of a little salt (potassium phosphate) to the medium in which they live for the short period of thirty minutes, was sufficient to stimulate the worn-out cells to a renewed activity, and instead of dying like the organisms not thus treated they divided about 200 times more. This process was repeated again and again until the race finally succumbed in the 742d generation (see Calkins '04). The dividing power of the worn-out cells of an epithelium is capable of similar reinvigoration, even after the limits of growth have been attained, and renewed proliferation may take place in functional epithelium, giving rise to abnormal growths which have been explained without calling upon improbable and inexplicable embryonic tissues.

The stimulus to the renewal of the dividing activity of an epithelial cell in the case of carcinoma may very well come from the inclusions, notwithstanding the relatively small numbers present. Owing to the small size of these inclusions I am inclined to think that they are frequently overlooked, and that their scarcity is somewhat traditional. I have found them in abundance in a rapidly growing carcinoma where they are supposed to be less numerous than in the older, more slowly-growing types. If the analogy with the worn-out race of Paramœcium holds good for the epithelial cells, then would it be unnecessary to have a parasite for each cell as Ribbert assumes; a single stimulated cell, if reacting like Paramœcium, would divide again and again after stimulation, and the effects of the parasite would be a Fernwirkung in a new sense.

In a certain sense the stimulus which a parasite might thus produce is not unlike the action of a spermatozoon in the egg. In relative volume to the egg cell the male cell is no greater than the relative volume of the X-body to the epithelial cell, and yet it produces the wonderful result of development. Its action has been interpreted as an effect of enzymes, and in support of this explanation the work of Loeb and others on artificial parthenogenesis has been cited. The same effect as that of a spermatozoon has been produced by a minute quantity of magnesium chloride, and the stimulus has thus been given for the egg to divide again and again, while self-regulation and differentiation work together to mold the cell progeny into the form and structure of the organism. Here then is the temporary action of a foreign substance upon living protoplasm, the effects of which are felt long after the direct contact, and another instance of this special type of Fernwirkung.

If a toxine of this type is at work in carcinoma it would not be unreasonable to assume that a certain optimum is necessary to produce the stimulating effect; if this optimum is exceeded, growth may be retarded; if the proper amount is not present the effects will be nil. In the experiments with Paramœcium I found that a certain quantity of salt and a certain time of its action were necessary for successful results, and the same experience has been met with by all who have attempted to induce artificial parthenogenesis in eggs. This may be one explanation of the slow growth of cancers in which the number of the X-bodies in the epithelial cells is relatively large. Upon such an hypothesis it may be seen that while possible carcinoma parasites have no such effect as the smallpox organisms for example, such parasites might be quite sufficient to stimulate cell development and tumor formation while the ensuing morbidity and ultimate cachexia might well be traced to general poisoning due to a disordered system and not directly referable to the parasites themselves.

SUMMARY.

1. There are two main groups of inclusions in carcinoma, those which are encapsuled, and those without capsules.

2. Encapsuled inclusions appear under several forms, sometimes definitely cellular in which case they are recognizable as blood cells or epithelial cells, sometimes variously modified by degenerative changes and unrecognizable.

3. The various modifications of such inclusions have been variously and erroneously interpreted as stages in the life history of protozoan parasites.

4. Attention is directed to the fact that parasites in cell-protoplasm can not get food nor rid themselves of waste products when enclosed in capsules.

5. The same principle may account for the degeneration of encapsuled invading cells such as leucocytes, lymphocytes, etc.

6. Capsules or cysts around parasites are formed not by the host cells but by the parasites at periods of reproduction or for protection

of spores, etc. Capsules around cell inclusions in carcinoma are formed by the protoplasm of the invaded cells.

7. Non-encapsuled inclusions in the form of secretions, degenerations, metaplasmic modifications, etc., are likewise present in cancer cells. These must be correctly interpreted before any parasite hypothesis is advanced.

8. The X-body of Behla is not satisfactorily explained as metaplasmic, degeneration or secretion product, although it is not yet known to be independent from blood-cell origin. It appears without a capsule but lies in a vacuole in the cytoplasm or nucleus. It possesses a granule or granules which take up the chromatin dyes with marked intensity. In some cases it shows strong evidence of spontaneous movement.

9. Theoretical considerations are not entirely sufficient to outweigh the morphological evidences of an organism. The small number of inclusions indicates that no such results are to be expected as those which follow the presence of masses of parasites as in smallpox or scarlet fever, or malaria, but experimental results show that great proliferating stimuli may be given by minute quantities of poison, and *a priori,* grounds are thus obtained to justify the effect, in this case a tumor, through the activity of a relatively few parasites.

10. The proliferating epithelial cells of carcinoma do not show the characteristic of embryonic cells, but rather of senile degenerate cells as shown by cell and nuclear hypertrophy, and by loss of the self-regulating power which is particularly characteristic of young or embryonic cells.

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Description of Plates.

All figures are drawn with the camera with lens system of ocular No. 6 Zeiss and Objective 1.5 Zeiss. Magnification about 1,800 diam. All inclusions represented are from one case of carcinoma.

Plate I.

Fig. 1. A cell-inclusion of unknown origin but probably a degenerating epithelial cell.

Fig. 2. Epithelial cell with invaded blood cell (lymphocyte).

Fig. 3. Cytoplasmic degeneration beginning in invading leucocyte. The nucleus of the invader is not yet affected.

Fig. 4. Degenerating lymph cell in which no trace of cytoplasm remains.

Fig. 5. Further stage in the degeneration of blood cell. The chromatin of the nucleus is massed, although not so densely as in the preceding figure.

Fig. 6. Late stage of nuclear metamorphosis of an invading blood cell. The thickness of the capsular rim is characteristic of the inclusions in this stage.

Fig. 7. Colloidal masses in a vacuole with capsule, representing possibly, the end phase of degeneration of an invading cell.

Fig. 8. A "Plimmer's body" consisting of vacuole, central spot and rim. Indicating no differentiated granules like those of the X-body.

Fig. 9. Homogeneous spot of foreign substance in cytoplasm, characteristic of many inclusions in the epithelial cells.

Fig. 10. Similar body somewhat larger, with a characteristic vacuole.

Fig. 11. Two "Plimmer's bodies" with central, differentiated spot.

Fig. 12. The X-body of Behla, indenting the nuclear membrane, and with highly characteristic form including pseudopodial processes which may be traced to the periphery of the vacuole, and an internal differently staining spot which is always sharp and clearly defined.

Fig. 13. A form of the X-body which was seen only two or three times. It stretches between two adjacent cells and each enlarged end contains three distinct spots which take the chromatin dyes.

Figs. 14 and 15. Two characteristic X-bodies.

Figs. 16 and 17. Two similar amœboid masses with definite granular masses of chromatin-like substance. One has a capsule, the other has none. These cannot be organisms but their origin is not made out.

Fig. 18. An X-body partly embedded in the polymorphic nucleus of an epithelial cell.

Plate II.

Fig. 19. Epithelial cell with leucocyte invader, and minute X-body of characteristic form and content.

Figs. 20 and 21. Two stages in the degeneration of an inclosed blood cell. In the latter the nucleus is becoming homogeneous and contracted through the loss of nuclear fluids.

Figs. 22 and 23. Two later stages in the degeneration of invading blood cells. The compact nucleus is much reduced in size and the cytoplasm appears broken.

Fig. 24. Last remains of what is apparently the end stage in degeneration of the inclosed cell; nothing is present but a homogeneous central dot, while the remainder of the cavity inside the capsule is flocculent and unformed.

Fig. 25. A figure representing a late stage in the degeneration of a cell with chromosomes. These are the "tadpole" forms described by Sawtschenko and interpreted as parasites in the slime formed by a degenerating cell.

Fig. 26. A cell with nucleus broken into many fragments which appear uniform in size and characteristic enough to be regarded by many as stages in the reproduction of a parasite.

Fig. 27. Fat-like particles in an epithelial cell showing fusion of droplets.

Fig. 28. Nucleus of epithelial cell with several questionable bodies in the cytoplasm and one similar body in the nucleus. Suggested as a possible early phase of the intra-nuclear X-body.

Figs. 29-33. Various phases of the X-body. In the last two the chromatin material is in the form of minute granules resembling the nuclear conditions of many lower forms. In figure 30 the X-body has the form of an amœboid organism apparently in the process of migrating from the vacuole into an adjacent epithelial cell. It is very difficult to interpret this form as a degeneration product or portion of a leucocyte. The chromatin material is in four separated granules, one at each end of a pseudopodia-like process.

Fig. 34. A stage in the anaphase of mitosis showing chromosomes and spindle fibres but with no trace of the X-body at the poles as would be expected were Borrel's centrosome-hypothesis correct.

Fig. 35. An intra-nuclear X-body with typical structure.

Fig. 36. An enlarged epithelial cell with hypertrophied nucleus and curious neck-like process; a type of cell which was supposed by Eisen to be a specific parasite of cancer and named by him "Cancriamœba macroglossa."

Fig. 37. A cell with a minute inclusion of unknown origin. The appearance of the minute elements within the vacuole suggests that it is derived from a misplaced chromosome, but not enough stages were observed to warrant this interpretation.

Plate III.

Fig. 38. A stage which is difficult to interpret without comparison with the earlier and similar figures. It represents a rather late stage in the degeneration of an invading cell with the compact nucleus undergoing secondary vacuolization preparatory to the formation of numerous granules as represented in figure 6.

Figs. 39-42. Stages in the metamorphosis of the "nucleolus" of epithelial cells, showing the hollow sphere, the reticulated nucleolar body (figure 40, compare with this figures 53 and 54) the clathrate body and the degenerate vesicular body with change in color reaction.

Fig. 43. A stage analogous to that of figure 24.

Figs. 44, 45, 46. Various stages to show the nature of the chromatin in the X-body in the form of separated granules, sometimes of small size, sometimes large.

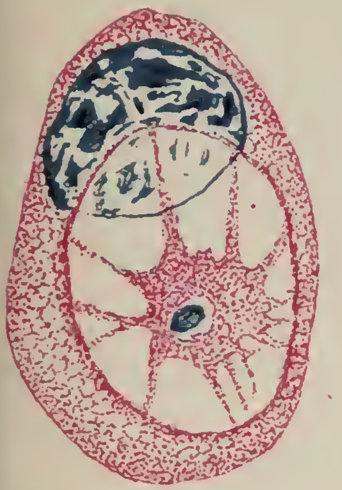
Fig. 47. An interesting stage suggestive of reproductive process in some single-celled organisms. Each chromatin granule has its separate bit of cytoplasm.

Figs. 48-52. Similar types frequently found in this cancer.

Figs. 53-56. Characteristic intra-nuclear forms which are identical in structure to the X-bodies in the cytoplasm. Possibly to be identified as degenerations of the nucleolus as shown in figure 40. Figure 56 is a curious structure which were it not isolated, might suggest a stage in merozoite-formation of a coccidium, but is probably only a particular type of nuclear degeneration.

Figs. 57 and 58. Two nuclei with buds showing the possible mode of origin of structures like those shown in figure 10, etc.

Fig. 59. Another mitotic figure in the metaphase stage showing that the spindle-poles, although provided with centrosomes have no trace of astrospheres.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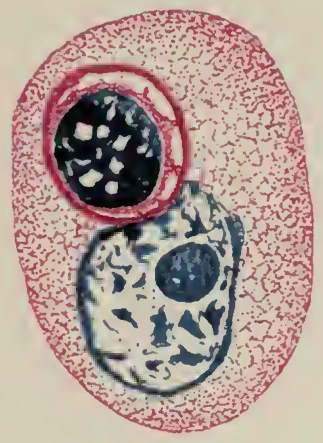
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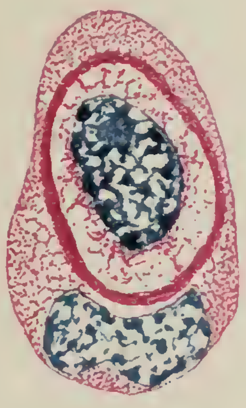
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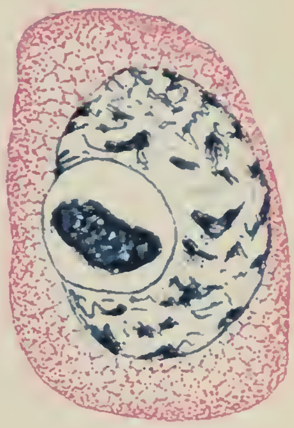
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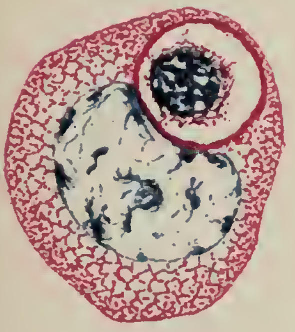
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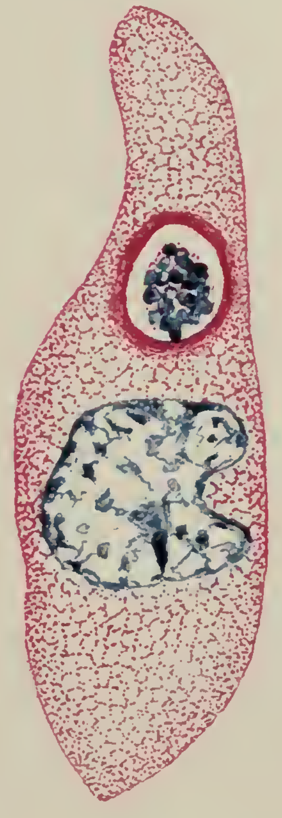
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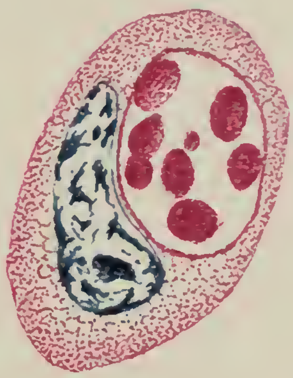
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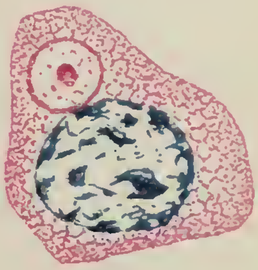
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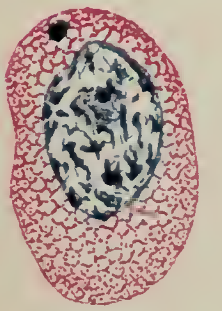
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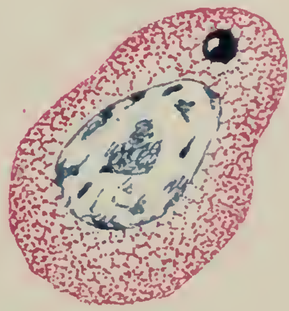
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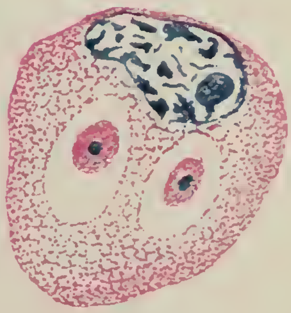
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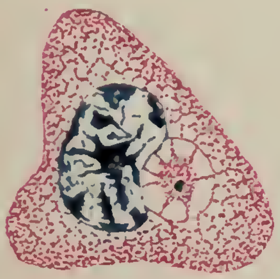
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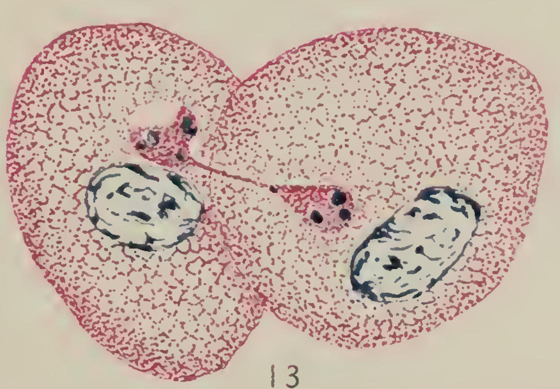
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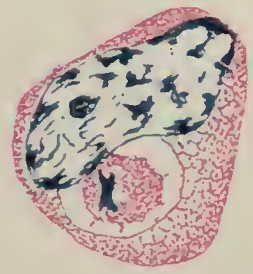
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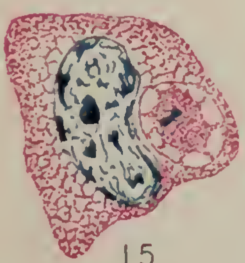
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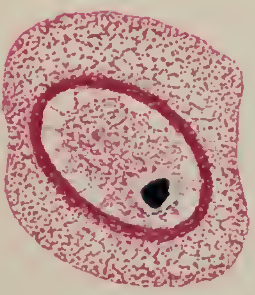
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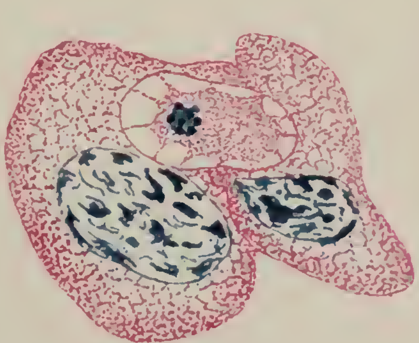
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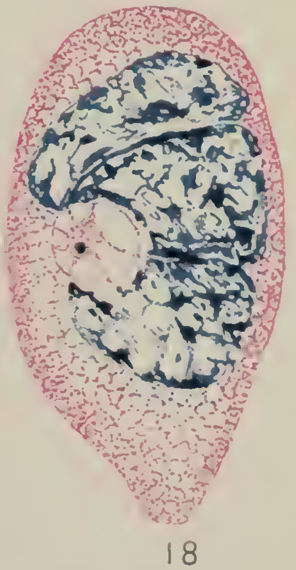
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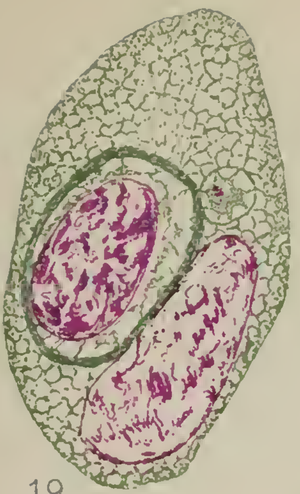
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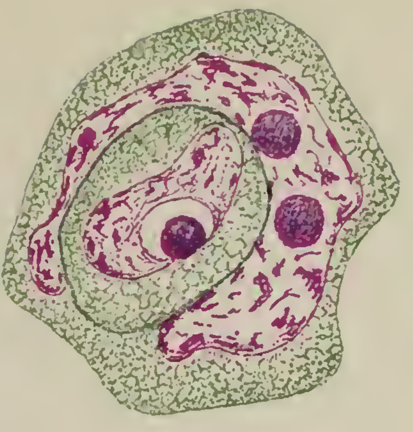
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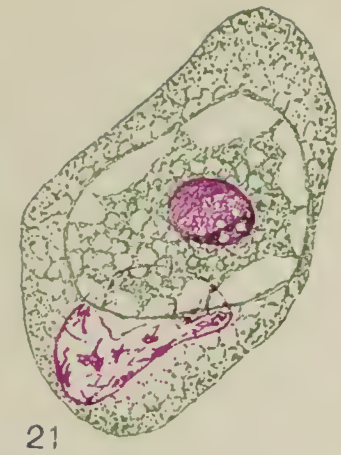
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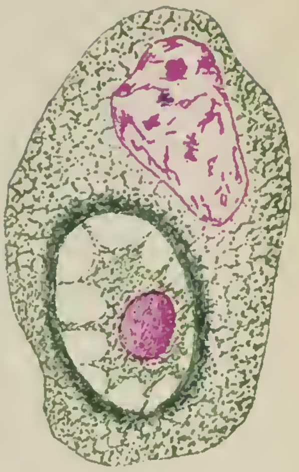
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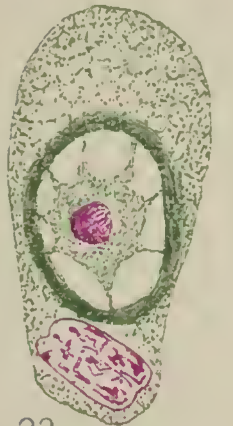
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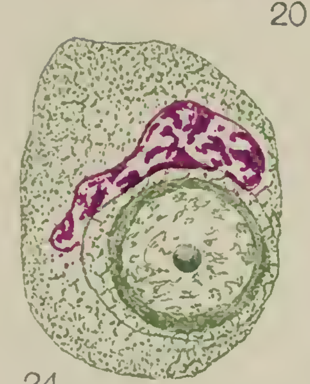
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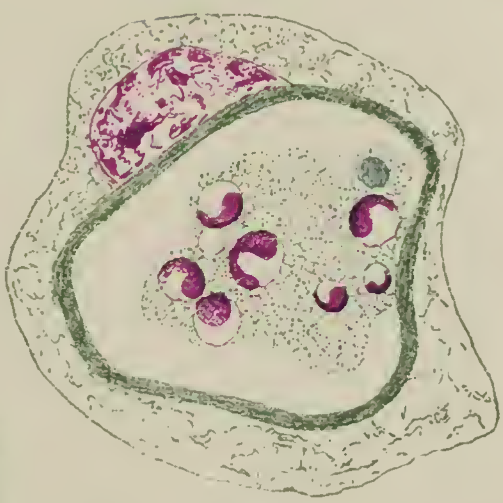
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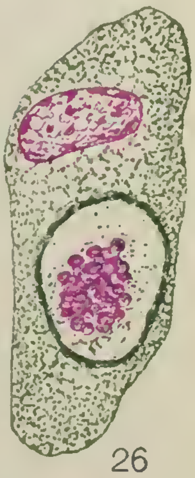
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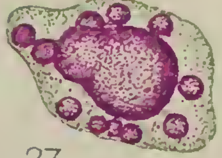
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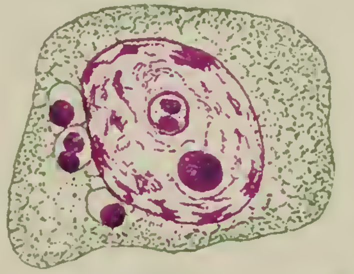
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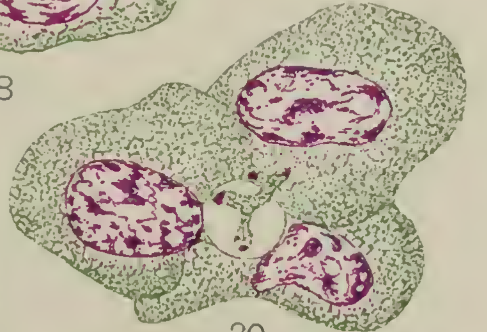
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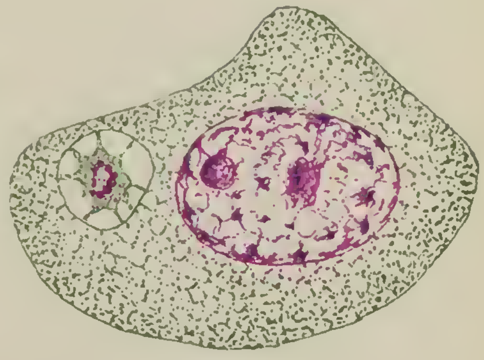
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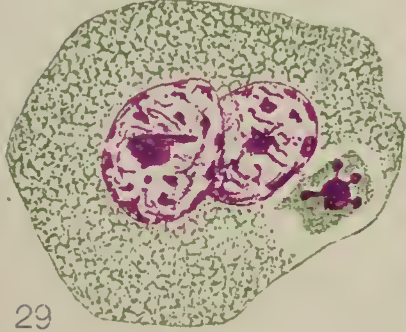
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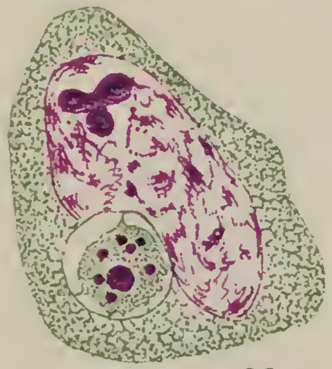
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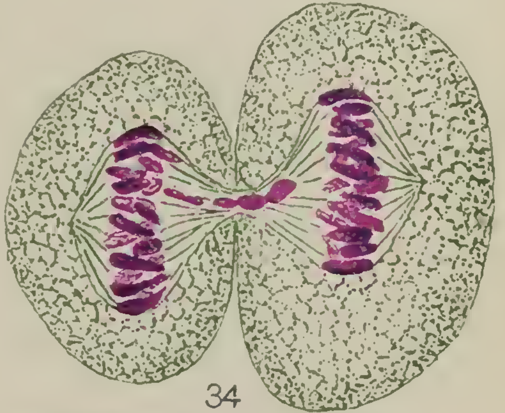
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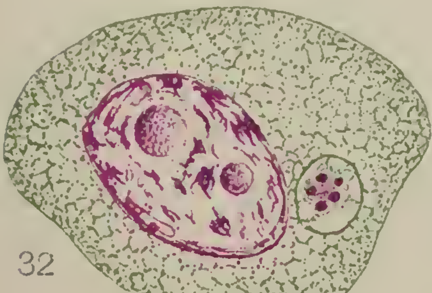
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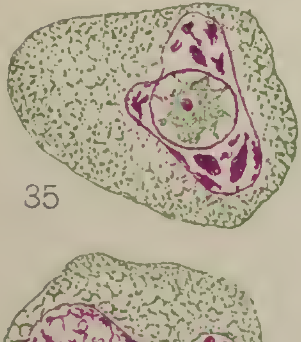
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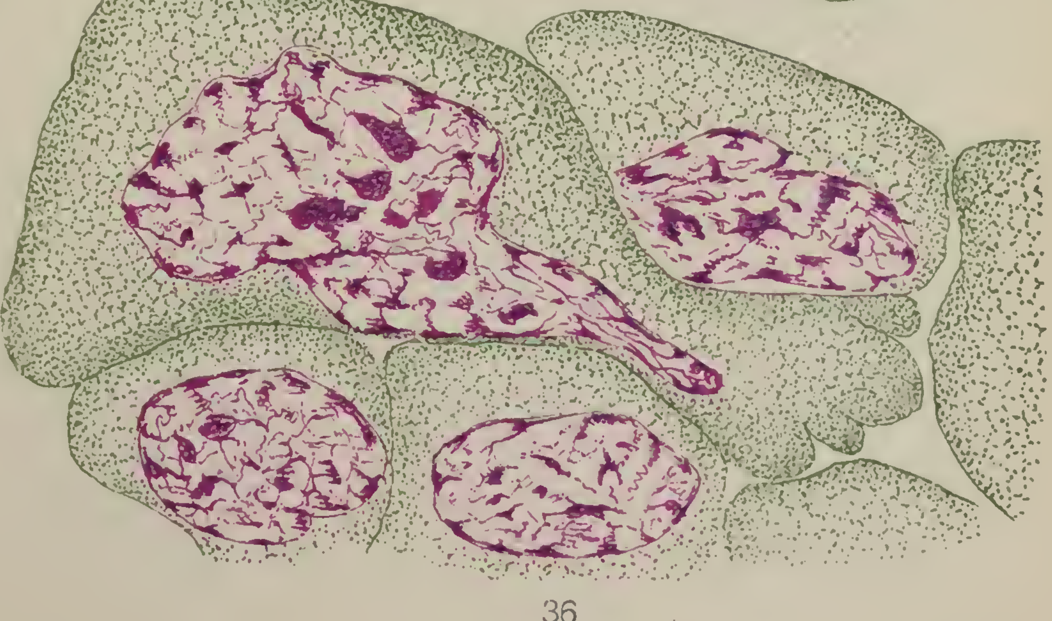
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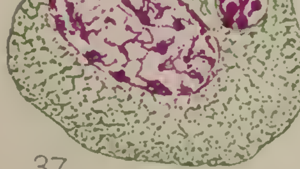
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ON THE ANALOGY BETWEEN SMALLPOX AND CANCER.

By H. R. Gaylord, M. D.

The idea that certain points of similarity exist between the cancerous process and the acute exanthemata, especially smallpox, is by no means new. Attention has been called to the subject from two entirely different points of view, both, however, having as their basis the infectious nature of cancer. Those who have been engaged in the study of the cell-inclusions of cancer and vaccine and find in these inclusions certain points of resemblance were the first to call attention to the analogy existing between the two problems. The second point of view is as yet represented by Borrel, who has recently attempted to show that without regard to the question of the inclusions (which he views as often characteristic of the process but not as parasites), certain points of similarity can be traced which lead him to the conclusion that although the nature of the agent is as yet undiscovered, both the epithelioses and epithelioma are infectious and may be said to possess a virus which is capable of transmitting the disease. He supposes the existence of a cancer virus, which is suggested to him by results recently obtained in the transplantation of epitheliomata in mice. Regarding the similarity of the virus found in smallpox and the virus obtained in sheeppox (clavelée), Borrel brings many points of interest, especially certain experiments with the latter which is found to pass through coarser grades of the Chamberlain filter but not through the finest.

Without entering here into the details of Borrel's research, to which we shall later have to refer, we may say that he favors the idea that in both cancer and smallpox the infective agent is a minute, if not invisible parasite, and that the inclusions are the result of degenerative changes in the protoplasm or of invaginated leucocytes in process of disintegration. He finds in sheep-pox a characteristic inclusion in the cytoplasm of the epithelial cells, and in an epithelioma of the mouse which he used for transplantation, similar inclusions. The inclusions found in the corneal epithelium of the rabbit after inoculation with vaccine, he believes with Salkowski, can be reproduced by irritants such as diphtheria toxin, or superheated vaccine.

In the light of the recent work of Councilman, Brinckerhoff and Macgrath, and the elucidation and confirmation which their work on vaccine and smallpox has found at the hands of Calkins, it would be profitable to recall the points of resemblance which may be traced between cancer and these processes on the basis of the inclusions found in both.

The first author who especially called attention to the similarity of appearance between certain forms of the so-called vaccine body or Cytoryctes vaccinæ (Guarnieri) was Gorini.* This author pointed out that in inoculated corneæ certain larger forms of the vaccine body were frequently surrounded by a form of capsule, and that they then closely resembled the cell-inclusions of cancer. The forms in question in vaccine had been described previously by L. Pfeiffer, Guarnieri and Clarke and were interpreted by these authors as a more advanced stage of development of the smaller and characteristic vaccine body. A gradual transition between the typical vaccine body and these larger inclusions could be traced by Gorini, who concluded that they are developed from the smaller inclusions. These larger bodies he finds possess a high degree of similarity in form and appearance to the cell inclusions of cancer.

In 1900 we were led to conclude that the inclusions of cancer and those of vaccine were essential in their nature, although not identical, and reinforced by the publication of Wasielewski† who, to our mind

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*Gorini. Centralbl. f. Bakteriologie Abt. I, Vol. 28, 1900.

† The conclusions of Wasielewski are so important that it is not out of place here to give them in full:

Contribution to Our Knowledge of the Nature of Vaccine.—Von Wasielewski Zeitschrift für Hygiene, Vol. XXXVIII, Part 2, October, 1901.

"*Conclusions.* The vaccine bodies are the single characteristic structures which are found in the epithelial cells of the skin and mucous membrane brought all but convincing proof of the parasitic nature of the Cytoryctes vaccinæ, we arrived at the conclusion that the conditions surrounding both problems were identical and that if the inclusions in vaccine were parasites, the inclusions in cancer were likewise parasites.

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in vaccine and variola. These are absent in normal epithelial cells of the skin and under all other conditions. The bacteria described as the specific factors in vaccine are saprophytes and have no etiological significance as shown by the efficiency of lymph entirely free from bacteria.

"2. The characteristic vaccine bodies invariably appear in the corneal epithelium of rabbits inoculated with potent vaccine.

"3. The same structures can not be induced in the epithelial cells of the cornea in rabbits in any other way.

"4. It is impossible that the vaccine bodies are leucocytes or degeneration products of leucocytes.

"5. The derivation of these bodies from the nuclei of the epithelial cells is disproven by, first, their appearance in perfectly normal cells; second, their presence in cells which are undergoing mitosis; third, by the appearance of the smallest of these bodies at the periphery of the lesion, where they make their first appearance in the peripheries of the cells most widely distant from the nuclei.

"6. The origin of these bodies from the cell protoplasm as the result ot the specific action of an organism supposedly invisible because of its minuteness, can not be proven or entirely disproven but is rendered throughout improbable on the following grounds: *a.* Because the specific factor of vaccine can be removed by filtration for which reason there is no ground for supposing it to be an infinitely minute organism. *b.* Because the vaccine bodies appear in cells undergoing division in which the karyokinetic figures show the characteristic protoplasmic radiation and the figures themselves are derived from the central portion of the cytoplasm, which according to the views of Hueckel is first affected by the specific action of vaccine. *c.* Because a similar specific transformation involving alone special portions of the protoplasm has never been proven in any other case. *d.* Because the extensive and rapid appearance of degeneration and vacuole formation as that of the granulated degeneration of the vaccine bodies has never been observed in any of the degeneration processes of the protoplasm, because the development of such characteristic cell-inclusions can not be compared with any known form of cellular degeneration. *e.* Because the impotent filtrate of vaccine lymph has no specific toxin action upon the epithelium.

"7. Size, form and structure, distribution and extension at the point of inoculation, as well as the appearance of evidences of division and degenera-

Our analogy extended likewise to the examination of fresh material in which we found certain hyaline bodies which we compared to the so-called fresh vaccine body.

On the same date of the same year Bosc* published an article advancing exactly the same idea but including sheep-pox, a disease which we had not been able to study. Bosc went so far as to classify these diseases and believes that they form a group of sporozoan infections. Bosc gives an exhaustive description of sheep-pox, the virus of which causes epithelial lesions and connective tissue nodules in the subcutaneous tissues. In the exudate obtained from fresh postules he found characteristic epithelial cells containing highly refractive bodies embedded in the protoplasm and similar free bodies, many very small, which presented characteristics similar to the inclusions in the cells. He finds that some of the inclusions and free bodies take the nuclear stain, although irregularly. In

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tion forms, speak for the supposition of Guarnieri that the vaccine bodies are parasites (schmarotzi) within the cells.

"8. The changes which the presence of the vaccine bodies induce in the cells support this view.

"9. The propagation of vaccine through forty-eight generations by inoculation on the cornea of rabbits proves that an active continuous proliferation of the vaccine bodies occurs at the site of inoculation.

"10. That, besides the vaccine bodies at the point of inoculation, no other organisms are either microscopically or bacteriologically demonstrable, and the constant reappearance of the vaccine bodies to the forty-eighth generation is demonstrable."

The author concludes that the supposition of Guarnieri that the vaccine body is the vaccine organism must be viewed as extremely probable.

The importance which we attached to Wasielewski's work and our point of view is shown by the following paragraph taken from the manuscript of an address given by us in Detroit February 21, 1902, before the Wayne County Medical Society: "It is manifestly impossible to apply all of these conclusions to the organisms of cancer, inasmuch as the experimental basis in cancer is infinitely more limited, but by a realization of the intrinsic nature of the two problems, it may readily be seen that the definite establishment of the vaccine body as the vaccine organism places us a great step forward in an appreciation of the true significance of these characteristic cell-inclusions in cancer."

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*Bosc. Archives de Medecine Experimentale. Vol. XIII, No.3. May, 1901.

many, however, the central portion of the body takes a chromatic stain. Similar inclusions are to be found in the cells forming the connective tissue nodules. *The inclusions vary in size from bodies not larger than a micrococcus to large structures either spherical or of irregular form with a more refractive central body.* All the inclusions are surrounded by a more or less clearly defined zone of clear protoplasm. Bosc inoculated the cornea in a number of sheep and obtained a lesion similar to that of vaccine, the inclusions being very abundant by the sixth day. As controls he inoculated the cornea with pathogenic bacteria, fungi, dust and *superheated sheep virus.* In no case were inclusions formed which could be compared to the inclusions following inoculation with the fresh virus.

Without going further into the details of Bosc's paper, to which the reader is referred, it may be seen that he definitely establishes the presence of characteristic inclusions and shows that in this connection the virus is similar to that of vaccine. Neither Wasielewski nor Borrel describes intranuclear inclusions in vaccine or smallpox, but Bosc* has since published a paper on the parasite of variola which appeared the 24th of October, 1903, describing practically all the forms observed by Councilman. His paper, although appearing several months after Councilman's preliminary announcement, affords an independent observation of these structures. Thus far in sheep-pox no intranuclear forms have been observed.

The only reference to nuclear inclusions in vaccine, which in the light of Councilman's work receives a renewed interest, is that of Gorini.† Gorini found that certain forms of the Cytoryctes vaccinæ could be found within the nuclei of the epithelial cells of the inoculated cornea, and that many of the inclusions were so placed in relation to the nucleus that they must be looked upon as either penetrating or being cast off from the nucleus. Many of the intranuclear inclusions are of the larger variety; i. e., those already referred to as closely resembling the inclusions of cancer. Gorini concluded that either the Cytoryctes is a parasite which infects the nucleus and in many cases passes then to the protoplasm (or the reverse), or that the Cytoryctes is not a parasite but is a characteristic body derived from the nucleus. Which of these hypotheses he favors Gorini does not state.

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*Bosc. Comptes rendus des Séances de la Société de Biologie T. LV. p. 1204.

†Gorini. Centralblatt f. Bakteriologie. Abt. I. Vol. 29, 1901.

The presence of typical birdseye inclusions within the nuclei in cancer was first noted by Steinhaus.* A simple reference to his illustrations clearly defines this point. Plimmer† likewise found the same inclusions in nuclei and gave an illustration representing this phase. Their presence has also been noted, described and illustrated by Apolant and Embden, who in contradistinction to the above-mentioned authors, who held them to be parasites, believed that many of the birdseye inclusions are derived from the nucleus as the result of degenerative changes. In fact, Apolant and Embden believe that the birdseye inclusions in the protoplasm and the birdseye inclusions in the nuclei are produced by different processes and can not argee with Nösske that the only source of the inclusions is the degenerated protoplasm. This criticism applies to Greenough, who preceded Nösske in attributing these inclusions to secretive processes in the protoplasm. The presence of inclusions in the nucleus likewise diminishes the value of such experiments as those made under Aschoff's direction by Spirlas, in which the introduction of foreign cells into the peritoneum of animals leads to the formation of inclusions in their leucocytes which present a similarity to birdseye inclusions. These experiments tend to show that the inclusions are the result of foreign bodies entering the cells from without. They must also be found in the nuclei of the leucocytes, if Aschoff's criticism is to hold. For the nucleus these authors assume that the birdseye inclusions are formed in various ways. They assume these bodies are formed within the nucleus and that the central body which is often acidophile is derived from the nucleolus of the cell, which is basophile, by some process which simply changes its staining affinity. The inclusions with acidophile central bodies are in appearance identical with the inclusions in the protoplasm. They suggested that in many cases extrusion of the nucleolus with transformation of its staining affinities might account for the formation of some of the inclusions in the protoplasm. The idea that the inclusions with acidophile central bodies might have penetrated into the nuclei from the protoplasm, in which case it is not necessary to assume a mysterious transformation of the staining affinities of the central body, does not of course occur to these authors, whose purpose is to show that the inclusions are derived from the constituents of the cells and have not entered from without.

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*Steinhaus. Virchow's Archiv. Bd. 126.

†Plimmer. The Practitioner. April, 1899.

Borrel, who appears for the present to lay less stress on the centrosome as the origin of the inclusions, believes on the other hand that in most cases they are metamorphosed leucocytes. That it is manifestly impossible to prove that an object in a hardened section is passing in either direction must be apparent. It would seem, however, that unless we assume a multiplicity of sources for these so characteristic inclusions we are not able to satisfy the many observers who have studied them from other than the parasitic standpoint. On the other hand, those who view them as parasites offer but one explanation, and are reinforced by the presence in other recognizedly infectious processes of the epithelium of inclusions likewise viewed as parasites, which they closely resemble.

In our original publication* we noted the presence of intranuclear inclusions but devoted our attention more definitely to the cytoplasmic forms. Since the publication of Councilman's article Calkins has demonstrated the frequent occurrence of typical intranuclear birdseye inclusions, thus confirming the observations of Steinhaus, Plimmer and Apolant and Embden. The work of Councilman, showing the presence of a complete cycle of an intranuclear organism in smallpox, must undoubtedly call attention to the importance and shed light on the probable significance of characteristic intranuclear inclusions in cancer. If the restrictions of Apolant and Embden are correct in the case of the intranuclear inclusions of cancer, they apply with equal force to the intranuclear inclusions of Councilman in smallpox, and Gorini in vaccine. The only essential difference in the two cases, as we have previously pointed out, is that vaccine and variola are accepted as certainly infectious and cancer is not.

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*Third Annual Report of this Laboratory for the year 1900.

The grounds on which most pathologists refuse to see in cancer an infectious process is that as yet all experiments calculated to show the infectious nature of cancer have as their basis the transplantability of the cancer cell. In the case of Borrel, however, the transplantation results appear to have brought conviction of the infective nature of the process. His belief that the inclusions both in cancer and smallpox are not parasites leads him to the hypothesis that the organism of cancer must be of ultra-microscopic dimensions.

For this reason it is well to consider what is the evidence of ultra-minute organisms for vaccine, variola and sheep-pox. The virus of sheep-pox has been shown by Borrel to pass through the Berkefeld and the coarser grades of the Chamberlain filter. Vaccine is supposed not to pass through any of the bacteria-proof filters. We are, however, informed by Dr. Georges Dryer that he has recently succeeded in passing vaccine through Berkefeld bougies which were proof against the bacillus of chicken cholera, recognizedly one of the more minute bacilli. This being the case, vaccine is placed on the same footing as the virus of sheep-pox. Mouth-and-claw disease, which is mentioned by Borrel as one of the filterable infective agents, has, however, nothing otherwise in common with vaccine and has been shown by Wasielewski never to produce inclusions or lesions in the cornea which can in any way be compared to vaccine and sheep-pox. *Should we conclude that in these diseases we are dealing with a micro parasite?*

Borrel in his publication brings light on this point. In his filtration experiments with sheep-pox he discovered that when he diluted the virus with tap water, after four days there developed in the filtered and otherwise sterile virus a small protozoon, to which he gave the name Micromonas Mesnili. The organism when in its largest form in the virus (it is of course impossible to affirm that the organism under other conditions does not possess a still larger phase), was three or four microns long and as many wide. That the organism in question had nothing to do with the virus was shown when distilled or sterilized water was used to dilute the virus. Borrel found that this organism followed the same law as the active principle of the virus, that is, it passed through the filters through which the virus passed and was held back by filters which were proof against the virus. That the organism passed through in some practically invisible spore form and then developed on the suitable medium of the virus was shown by its appearance in virus *only after four days* and the impossibility of detecting it in filtered water in which the larger forms did not develop. Borrel was forced to conclude that " Le passage à travers un filtre n'implique pas forcément l'idée d'un microbe invisible."* With these facts before him, however, Borrel pronounces against the inclusions as parasites and believes that the organism will prove to be a small if not an invisible organism.

It must be noted that Borrel's Micromonas shows as its largest form an organism considerably smaller than the larger inclusions of vaccine, variola and cancer. However, to assume that because the spore of an organism is sufficiently small to pass through a certain filter, its largest form would be within a certain limit of size, is not justified by biological knowledge. Calkins has described a protozoon, Lymphosporidium truttæ, the spores of which are one and one-half microns and divide into six sporozoites each less than one-half a micron in diameter. Borrel likewise points out that there is an essential difference between the smaller forms of motile, animate parasites and bacteria of relatively the same dimensions. The first are more plastic and accommodate themselves to the pores of the filter and pass through where bacteria are held back. In all probability the sporozoites of Lymphosporidium truttæ, less than one-half a micron in diameter, would pass through a bacteria-proof filter and yet the largest form of this organism is a multinuclear amœba twenty-five microns in diameter.

For this reason there is no ground for supposing that the filtration experiments are opposed to the protozoan theory of smallpox. What must we conclude then in the light of Councilman's and Calkin's observations? If these observations are correct we have an intranuclear and protoplasmic parasite of considerable dimensions, which, in one of its phases, passes through a Berkefeld bougie. The cytoplasmic and certain intranuclear forms described by Gorini have a recognized similarity of appearance to the cytoplasmic and intranuclear inclusions in cancer. The difficulty in carrying the analogy further is found in our inability thus far to separate from the epithelial cells in cancer an infective agent capable of producing cancer even in animals of the same species. All of the experiments in cancer have as their basis the epithelial cell, and it has thus far been impossible to apply with success filtration experiments similar to those of Borrel and others in smallpox. For this reason it is difficult to understand why Borrel, who believes in the infective nature of cancer, should seek its solution in an ultra-microscopic organism. It would appear that the closest analogy which we can draw between smallpox and cancer is the presence of the inclusions in the epithelial cells, and it would seem that filtration, even in the light of Borrel's experiments, in no way shakes the conclusions of Councilman and Calkins.

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* Without attempting to discuss all the filterable viruses it may be noted that the blood of yellow fever patients passes through the Berkefeld bougie but not the fine Chamberlain. Without regard to the work of the Marine Hospital Commission which has been so sharply criticised by Carrol, it must be noted that the relation of the mosquito to this disease strongly suggests a protozoon, perhaps an extremely small one.

We have maintained from the first that the solution of the vaccine-variola problem, with the establishment of the vaccine body as the vaccine organism, would bring, as a natural consequence, the establishment of the probable protozoan nature of the inclusions of cancer. The difficulty of the problem in cancer is unfortunately greater than in smallpox, owing to the limitation of experimental possibilities, but the advances which have been made in the study of the inclusions of the exanthemata have already thrown a suggestive light on the question of the inclusions in cancer. As the whole question stands, it must be conceded that the importance of questionable inclusions in processes with obscure etiology has greatly increased, and that the interpretation of the inclusions of cancer as parasites has gained rather than lost ground as the result of the researches of the last two years.

REPORT OF THE BIOLOGICAL-CHEMICAL DEPARTMENT

By G. H. A. Clowes, Ph.D.

A brief summary of the work carried out in the biological-chemical department since the completion of the new laboratory was presented in the Fourth Annual Report. In the absence of sufficient reliable analytical data it was decided to postpone publication of results, especially those bearing upon the metabolism of patients suffering from cancer, until a sufficient amount of confirmatory evidence had been accumulated. The work of the chemical department, either in progress or contemplated, was considered under three main heads: (1) Studies in metabolism regarding the equilibrium of nitrogenous bodies, chlorides, etc., in the system, and including work on the stomach contents, blood and urine; (2) Micro-chemical investigations carried out with a view to obtaining evidence regarding the cause of cancer and the nature of the disturbances taking place in the metabolism of the individual cancer-cells; (3) Attempts to cure cases suffering from cancer by means of serum-therapeutic treatment or chemical agencies, the possible value of which had been indicated by investigations carried out under the two first heads. To these three main lines of work must be added a fourth, to which a considerable amount of attention has been paid in the course of the last two years; the examination of cancerous material and the serum of cancer cases for hæmolysins, precipitines, etc., applying the principles evolved in immunity studies carried out in other directions.

The work included under the heading of metabolism is practically completed and the results obtained are to be found in a series of papers published in this report dealing with the nitrogen and chlorine equilibrium established between the food and excreta of cancer cases, and the influence of varied proportions of salts in the diet upon the blood and urine. In this portion of the work special attention has been paid to the question of improving the nutrition of patients suffering from tumors which from their nature and location are capable of interfering with the proper assimilation of food.

A paper has also been included dealing with the secretions of the stomach in cancer as compared with normal and other pathological conditions and indicating to what extent chemical analysis of the contents of that organ can be utilized for diagnostic purposes, and also endeavoring to throw light on the nature of the disturbances in osmotic equilibrium which lead to an interference with the normal secretions.

In a paper dealing with the possibility of diagnosing cancer by considering the nature and proportion of the various urinary constituents it is pointed out that any indications obtained by this means regarding the location of a tumor are purely the result of secondary interferences with the metabolic equilibrium of the cells of the organs involved, and that no specific cancer reaction can be said to have been obtained by this means.

Abstracts of papers published in other journals dealing more particularly with the physico-chemical problems involved in the osmotic equilibrium of a variety of pathological cases have been included.

Throughout the work referred to above an effort has been made to present a thorough summary of the literature to date of publication, and to point out wherein the work carried out in this Laboratory is in agreement with or deviates from that of previous investigators.

Under the second head of micro-chemical research a paper dealing with the staining reaction of mast cells, etc., has already been published, and further work of this nature dealing more especially with the cancer-cells themselves is already in course of completion. Special effort is being devoted to the problem of obtaining an immunity against cancer, and horses are being employed for the preparation of sera. The results obtained in this direction are not, however, sufficiently positive to permit of any immediate expression of opinion regarding the ultimate probability of success. The possession of a series of cancer mice, kindly put at the disposal of this Laboratory by Professor Jensen, has made it possible to commence experiments on immunity on a much larger scale and with much greater likelihood of success than was possible when dealing with human cases exclusively.

In view of the interest attaching to the employment of X-rays in the treatment of cancer, a short note on the influence which they exert on the metabolism of normal animals has been incorporated in this report.

A series of analyses of mouse tumors taken at various stages of development is being carried out in this Laboratory at the present time. Such tumors, having an absolutely common source, afford a much more satisfactory basis of comparison than can be hoped for from a series of human tumors.

Finally, with a view to possible early diagnosis, tumors and the blood sera of cancer cases have been examined for hæmolysins, precipitines, etc. Whilst certain positive results have been obtained, it has not at present been possible to prove conclusively that the reactions in question were directly dependent upon the cancer, or the result of some secondary interference. With the cancer mice at our disposal it is hoped that we shall be able to obtain positive results bearing on the question of immunity and serum diagnosis, to which it is proposed to devote the special attention of this Laboratory during the forthcoming year.

STUDIES IN CANCER METABOLISM.

By G. H. A. Clowes, Ph. D., W. S. Frisbie, Ph. B., and H. H. Glosser, M. D.

A review of the literature published in the course of the last fifty years on the equilibrium of nitrogenous bodies and salts in cases of impaired metabolism makes it apparent that the most divergent views are held on this subject by different investigators. Marked disturbances in the secretion of urea and chlorides in cachectic cancer cases were first observed by Vogel, Rommelaire, Jacoby and others, but these early investigators made very little attempt to carry out strict analyses on the food stuffs consumed in comparison with the waste products excreted. Müller and Klemperer (to whose publications a detailed reference will be made later) came to the conclusion that under the influence of toxic bodies produced from tumors a loss of nitrogen was suffered by the body, while Moraczewski in the majority of his cases finds a retention of nitrogen in the system, the amount contained in the food being in excess of that secreted in the urine and fæces. Similar differences of opinion are to be noted in the works of Müller, Laudenheimer, Schöpp, Bouveret, Böhne and Moraczewski on the retention or secretion of chlorides. A considerable increase in the proportion of sodium chloride in the blood of certain cancer cases has been observed by Moraczewski, and it has even been claimed that greatly increased quantities of chlorides are retained by certain organs of the body, especially in those cases in which an œdematous condition is to be observed. In many of the cases investigated disturbances in the equilibrium of salts were found to be associated with an impaired secreting function of the kidney, which would make a clear differentiation between cause and effect extremely difficult. Great advances have been made in physical and physiological chemistry since the publication of the work of these early investigators. The laws of osmosis governing the equilibrium between soluble salts, the body fluids and the cells render it extremely improbable that large quantities of sodium chloride, for example, could be retained in the system, as has been claimed by some writers, without the retention of a corresponding quantity of water necessary to maintain, at any rate to a certain extent, the osmotic equilibrium, which would cause an increase in body weight. The ability of certain electrolytes to aid in the removal of products of suboxidation from the system, has long been recognized and more recently the studies of Köppe, Hamburger, Gerber, etc., on the metabolism of blood cells have demonstrated the significant role played by chlorine ions in the removal of products of oxidation from the cell. It is perfectly conceivable that toxic bodies produced from a tumor might seriously interfere with normal osmosis; also that the abnormal products produced through the disintegration of cells and the influence of toxins might prevent to a certain extent the dissociation of salts, thus interfering with their normal function and at the same time reducing the osmotic tension which they exert and lead to their retention in larger quantities in the system, such a process being accumulative in its action. Loeb, Matthews, Calkins, etc., have shown how significant is the role played by electrolytes in the stimulation of individual cells, and the possible influence of disturbances in osmotic equilibrium of the cell leading to its proliferation can scarcely be ignored.

In this paper it is proposed, in the first place, to summarize the existing literature bearing on the problem of nitrogen and chlorine metabolism in cancer as compared with the normal, and subsequently to record some results having a bearing on this subject obtained in this Laboratory in the course of the last two years. Whilst our main object in carrying out these experiments has been to find some means of improving the nutrition of cases in which tumors have directly or indirectly interfered with the proper assimilation of food, and also to study the effects exerted by various salts and chemical bodies when taken in conjunction with the food or on direct injection, the exact analyses carried out from day to day on the diet, urine and fæces, and frequently on the blood, enables us to throw some light on the discrepancies observed in the literature and to arrive at definite conclusions which will be referred to at a later stage.

In reviewing the early literature one of the things that first impresses itself on one's mind is the absence of accurate data regarding the diet, the frequent disregard of the loss of nitrogen and chlorine in the fæces and the failure to record variations in the weight of patients. It should be possible to obtain a more or less accurate balance between the increase in weight of the tumor, the loss of body proteid, the formation of œdematous fluids and all such factors, when considered in conjunction, with the differences between intake and output of nitrogenous bodies and salts in a given period of time. In work of this nature the sources of experimental error, especially in the hospitals, are, as Müller points out, extremely numerous. Our own experience has taught us that unless the intelligent cooperation of a patient is obtained, or at least of all those immediately concerned with the charge of the case, it is perfectly useless to look for even moderately reliable results, however accurate the work in the laboratory may be. It is very probable that careless patients, especially those capable of moving freely about the wards, have deceived those who were interested in studying their metabolism, not only as regards their diet but also with reference to the twenty-four-hour secretion of urine, a fact which might well explain the contradictory results obtained by different authorities. One surprising source of error frequently met with in the literature is to be found in the change from a solid to a liquid diet. Milk without any addition of chlorides contains considerably less chlorine in proportion to the nitrogen than does the normal diet, consequently a diminished secretion of chlorides would be observed in the urine, and is not necessarily in any sense attributable to the influence of a tumor or other pathological cause.

Vogel, who was the first to investigate quantitatively the constitutents of the urine of a case of cancer of the liver, observed a daily secretion of urea under 8 grams and assumed that an actual retention of proteids took place in the blood in excess of those consumed in order to provide the materials required by the tumor cells in their development. Since, however, no records of the diet, of the nitrogen content of the stools or the body weight of the patient are recorded, this conclusion is scarcely justifiable. Rommelaire, in cases of cancer of the stomach, and Gregoire confirmed Vogel's observation of a greatly diminished secretion of urea, but these investigators seem also to have overlooked the probable diminution of proteids in the diet, and whilst reference is made to diarrhœa, no account seems to have been taken of the loss of nitrogen by that source. Robin expressed himself as opposed to the views held by the above-named writers, claiming that in well-nourished cancer cases the urea secretion was normal, and assumed that the diminution of nitrogen in the urea was simply to be attributed to a diminution of the quantity of proteid in the diet. Dujardin-Beaumetz supports Robin, finding in certain cancer cases high urea secretion, reaching 17 and 25 grams per diem, which he considers may be attributed to the influence of toxins secreted by the tumor, whilst certain nonmalignant tumors show results as low as 4 grams per diem.

The first work of this nature which can be said to have any real value was published by Jacoby in 1887. This author compared the daily nitrogen excretion of a normal individual with that of a case of carcinoma of the liver associated with jaundice, both cases receiving identically the same diet. He succeeded in demonstrating that whilst a normal individual could be made to gain weight and secrete less than 12 grams of nitrogen daily, the cancer case would lose weight and as much as 18 grams nitrogen would be eliminated in the urine.

The next paper on cancer metabolism possessed of any considerable value was published in 1889 by Friedrich Müller, who made an exhaustive study of the proteid equilibrium in a series of nine cancer cases, in some of which nutrition was mechanically interfered with by the tumor, and compared the results so obtained with experiments previously carried out by himself and other investigators (Senator, Monk and Zunz) on starving individuals. The conclusions arrived at by Müller are extremely interesting. He succeeded in demonstrating that in all his cases in spite of a rapid development of the tumor more or less loss of nitrogen was suffered by the body as a whole when the heavy loss of that substance in the fæces was taken into account. He also proved that this loss was more or less proportionate to the loss of body weight when due allowance was made for the formation of œdematous fluid. He further demonstrated that in those cases in which the nutrition of the patient was seriously disturbed by the developing tumor in such a manner that the loss of nitrogen by the fæces was practically equal to that contained in the food, the condition of starvation thus established was very comparable with that obtained in his experiments on starving normal individuals. In studying the influence of toxins produced by the tumor, Müller made one very valuable observation to the effect that whilst the average loss per kilo of body weight per diem was in the case of a series of starving healthy individuals only .103 grams nitrogen, that of four cachectic cancer cases amounted to .175, .225, .166 and .146 respectively. He also noted that even in one case in which the appetite of the individual under experiment was considerable, it was still found impossible actually to maintain the nitrogen equilibrium, although the amount of nitrogenous material assimilated was far in excess of that which would have been required by a normal individual of the same weight. He notes similar results in a case of typhoid during the early period of the disease and whilst the patient was suffering from toxic symptoms, the exactly reverse results being obtained during the period of convalescence. Müller concludes that in all cases of cancer the destruction of proteid suffered by the body owing to faulty nutrition and toxic effects is greater than the increase in proteid of the growing tissue of the tumor, and that consequently a loss of nitrogen is always suffered by the system. He attributes the coma of carcinoma to auto-intoxication through the products of metabolism which have not been removed owing to faulty functioning of kidneys affected by toxins. It is only to be regretted that this extremely accurate worker failed to take account of the chlorides present in the diet in order that they might be compared with those of the urine and fæces. In his analyses of urine the quantity of chloride was frequently extremely low, and he concluded without much ground that this signified the destruction of body proteid rather than circulating proteid. Sticker and Huebner observed a much higher secretion of sodium chloride in nonulcerating carcinoma than was the case in ulcerating carcinoma of the pylorus. G. Klemperer, who carried out fairly exact metabolism experiments on seven cancer cases, confirms the original observation of Jacoby, that when normal individuals and cancer cases are submitted to the same conditions of experiment, the former may gain whilst the latter lose in body proteid, a difference in nitrogen content of the food and excreta as high as 7.5 grams daily being observed. Huebner considers that the diminution in the alkalinity of the blood, and the fatty degeneration of organs, associated with increased tissue destruction, may be looked upon as evidence that carcinoma is an intoxication disease, and that the coma associated with the last stages may be attributed to the action of the poison derived from the tumor circulating in the blood and acting upon the central nervous system. Bouveret attempted to differentiate between diseases associated with hyper-secretion of hydrochloric acid in the stomach and cancer of the stomach by means of the secretions of chlorine in the urine, claiming an increased excretion associated with diminished secretion of hydrochloric in the stomach. This finding was not in agreement with that of Stroh, who observed a diminution in the chlorides secreted in both cases. Laudenheimer, experimenting on five cancer cases with reference to the chloride equilibrium, obtained in two cases a secretion of chlorides comparable with the consumption and in two other cases a marked diminution of the secretion of sodium chloride in comparison with the consumption. This author concludes that the disturbances in chloride equilibrium are the result of nephritic or circulatory retention of water and salts. Schöpp in a couple of papers claims that whilst the excretion both of chlorine and nitrogen frequently falls below the amount assimilated in cancer cases, the difference may generally be attributed to ulceration of the tumor, the secretion containing considerable quantities of sodium chloride. In a case of cancer of the stomach and one of breast carcinoma, equilibrium was maintained in the absence of ulceration.

From 1895 to 1897 a series of important papers were published by Moraczewski on the blood and urine in cancer, on metabolism in carcinoma and chlorisis, and subsequently on leucæmia and pseudo-leucæmia. In the first paper on the chlorine and phosphorus content of the blood and urine in cancer, after referring to the literature, the author estimated phosphorus, chlorine and nitrogen in the blood and urine of cases of carcinoma, anæmia and other pathological conditions. He found a reduction in the phosphorus content of the blood from the normal of .1 per cent to .07 and .04; chlorine, on the other hand, was high, amounting to as much as 4 per cent of the dried substance. He remarked further that as the chlorine in the blood increased the chlorine in the urine decreased in cases of carcinoma, but no particular reference was made to the condition of the kidneys. He considered that the nitrogen content was also increased in proportion corresponding with the increase of chlorine in cancer but not in anæmia. Moraczewski's work on cancer metabolism published in 1897, eight years later than that of Müller, gives results which are in no sense in accord with those obtained by the latter investigator. Whilst Müller observed a heavy loss of nitrogen in a long series of cases, Moraczewski found that large quantities both of nitrogen and chlorine were retained by the system, and at the best an approximate equilibrium was established. In none of his cases was a loss of nitrogen recorded over any extended period. The amount of nitrogen and sodium chloride retained in the system in a short space of time was frequently vastly in excess of the amount which would correspond with the changes in weight of the patient. In fact, in certain cases it is apparent that there must have been some source of experimental error, the quantities secreted being so far below those assimilated that either the patient must have gained ten or twenty kilo instead of, as was actually the case, undergoing very slight changes in weight, or chlorides must have been deposited in the tissues, which is practically impossible. Were it not for these discrepancies this work of Moraczewski's would be a most valuable contribution to the study of cancer metabolism. This author observed the proportions of nitrogen, chlorine, phosphorus and calcium in the twenty-four-hour urine whilst subjecting the patient to the influence of various salts, the diet being maintained on as uniform a basis as possible. He concluded that in cancer large doses of sodium chloride or calcium phosphate may be used to effect a saving of proteid whilst they stimulate the excretion of chlorides. He failed, however, to take account of the probable retention of waste nitrogen products in the œdematous fluids resulting from the presence of large quantities of these salts. He found that silver nitrate given in small doses increased the secretion of nitrogen and phosphorus and decreased that of chlorine and calcium, chlorides being retained as might be expected. Silver nitrate, however, produced diarrhœa and other acute symptoms in some of the cases to such an extent as to be discontinued. More especially was this effect to be noticed in anæmic cases. He concluded that the retention of chlorides is increased with the increase of anæmia, which is in accord with the supposition that such a retention of salts might merely represent the dilution of blood or body fluids which takes place under these conditions. He also found that phosphorus is retained in conjunction with chlorides in spite of the fact that phosphorus is present in the blood in proportions which are frequently the inverse of those of chlorine; also that the secretion of calcium is inversely proportional to that of phosphorus, and that a larger amount of calcium is retained in slightly anæmic conditions. In one case, for example, the addition of ten grams of sodium chloride daily to the food led, as would be expected, to an increase in the retention of chlorine and nitrogen, whilst the entire elimination of chlorides from the diet and the addition of ten grams of calcium phosphate led to a considerable chlorine loss. On the other hand, .1 gram of silver nitrate resulted in what was practically a balance of the proportions of nitrogen and chlorine, a much larger amount of chlorides being retained than during the treatment with calcium phosphate. Ten grams of sodium phosphate led to a retention of nitrogen and calcium, chlorine remaining about normal. Five grams of sodium chloride and 5 grams of potassium chloride led to a retention of nitrogen and chlorine and a proportionate loss of calcium and phosphorus. On comparing cancer cases with those of chlorosis he concluded that the latter are capable of taking much larger doses of potassium chloride than the former without noticeable toxic effect. Whilst an immense number of results were recorded in this paper, their failure to balance and a want of agreement in some cases detracts from their value.

Moraczewski also published a series of experiments on the chlorine, nitrogen, phosphorus and calcium equilibrium in a case of leucæmia and the data which he obtained extending over a period of six weeks, whilst the patient was subjected to a variety of different treatments, would indicate that a very considerable retention of nitrogen and chlorine in the proportions respectively of 40 and 30 per cent of the diet had taken place, a result which is most remarkable when it is borne in mind that in spite of the apparently rapid development of the leucæmic tumor no great gain in weight had been experienced by the patient.

Böhne found in a marked cachectic cancer case an average retention of 3 or 4 grams chloride daily for the space of four weeks, and claimed to have observed on post-mortem examination of the liver a sodium chloride content four times as great as that in the livers of three other patients. His observation has been supported by that of Achard and Loeper, who claim that the salt content of the muscle tissue of œdematous cases (non-cancerous) in which the chlorides are strongly retained, can be as high as 4.1 to 5.6 grams per 1000 in comparison with the normal, which is 1.6 to 2.8 grams per 1000; also that the brain substance, which normally contains 1.1 grams per 1000, may under conditions of abnormal retention give figures as high as 4.3 per 1000.

Cetti, in a publication concerned principally with the relative proportions of nitrogen constituents in the urine, found in two cases a secretion of nitrogen in excess of the consumption; in two other cases an ability to establish a fair equilibrium. He concluded that an increase in the proportion of extractive nitrogen is always associated with a decrease in the proportion of urea nitrogen as the disease progresses. He simply observed with reference to the chlorides that the total secretion was low, except in the case of one patient, who was receiving a full, normal mixed diet.

Koziczkowsky, in a valuable paper on the equilibrium of chlorides, refers to the frequently observed diminution in the excretion of chlorides in fevers (with the exception of malaria) and in carcinoma. The experiments recorded in this paper are directed principally to the solution of the problem as to whether chlorides, and to a certain extent other soluble salts, play a direct or indirect role in nephritis and œdema. He concludes that the retention or secretion of chlorides does not follow the same laws as those which govern the removal from the body of the products of metabolism, urea and other nitrogenous bodies, phosphates, sulphates, etc., but fails to bring very much evidence to bear on the question as to whether the retention of chlorides is due to their association in the system with katabolic products, or to disturbances in the osmotic equilibrium and mechanical forces of the body, and the ready diffusion through cell membranes, factors which might prevent the normal removal of salt. Engelman, in a communication on the osmotic pressure of body fluids, records results considerably above the normal in certain cachectic cases, but such results are generally attributable to heart and kidney insufficiency.

Braunstein, in a publication* dealing with the secretion of chlorides, phosphates, nitrogen and ammonia in carcinoma, after reviewing the literature, gives the results of a series of analyses carried out on the urine of 10 cancer cases, in five of which an exact record has been kept of the nitrogen and chlorine of the diet. In three of the five cases a loss of nitrogen was to be observed. In one case of carcinoma of the œsophagus the influence of the tumor on the destruction of proteid was very marked, the average daily loss for a period of four days being 10.6 grams nitrogen. In this case the chlorides were extremely low, both in the diet and in the excreta, no great difference being observed. Numerous experiments carried out on healthy individuals in a state of inanition show a loss of only three to five grams nitrogen daily, consequently any such loss as that recorded in the case referred to must be due to toxic action leading to an abnormal destruction of proteid. Braunstein failed to find any considerable differences between the salt content of the diet and the excreta, in certain cases the latter even exceeding the former. His experiments with diuretin led him to conclude that the sodium chloride secretion was directly proportional to the urine secretion, and that the accumulation of chlorides observed in certain cases was simply attributable to the failure of the kidneys to remove water, and with it the salts held in solution. He further states that in cancer an increase rather than a decrease of the secretion of chlorine in the urine may be looked for provided the kidney function is satisfactorily performed.

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*This publication was received in June, 1904, after the completion and shortly before the publication of this paper.

To summarize the literature on this subject, it may be said that widely differing results have been obtained by different authors, as regards the nitrogen and chlorine metabolic equilibrium of cancer cases. Whilst on the one hand it is claimed that nitrogen is retained in the system as a result of the tumor development and the demand created thereby for proteids, on the other hand it is shown that in spite of the tumor growth the nitrogen loss suffered by the system due to the destructive influence of toxins on the body proteids is very considerable except in those cases in which a marked œdema has developed, and in which the failure of the kidneys to function has led to an abnormal retention of waste nitrogen. Whilst numerous authors claim to have observed a diminution in the total amount of nitrogen and chlorine of the urine, especially in the last stages of cancer, few of the early writers regarded sufficiently diminutions in the proportion of chlorides in the diet, especially in those cases in which patients were no longer capable of assimilating solid food. Analyses of organ and body fluids showing an extraordinarily high content of chlorides, and records of the retention of enormous quantities of salt in the system far in excess of the amounts which would correspond with the observed variations of body weight and the laws of osmosis, lead us to suspect some source of experimental error, especially in view of the great difficulty in such work of properly controlling the individual submitted to experiment.

The possible importance of the chlorides in the establishment of metabolic equilibrium is more readily appreciated at the present day than was possible at the time at which most of the experiments referred to above were carried out. The intervention of modern physico-chemical theories of solution in physiological problems has demonstrated the important role played by individual ions and the dependence of any such influence upon the concentration and degree of dissociation of the compound from which they are derived. It has long been known that in fevers and other morbid conditions the equilibrium of the chlorides in the system is materially interfered with. This action may be due in part to mechanical causes brought about indirectly by the action of toxins on the cells of the heart, kidneys and other organs more especially concerned with the balancing of pressure, and consequently to a certain extent of diffusion and osmosis in the system. It may also be attributable to the action of toxins and of toxic products of faulty metabolism capable of clogging, so to speak, the normal functions of the salts in the system by preventing their proper dissociation into ions. The effect of toxins and foreign bodies upon the protoplasm of those cells of the stomach and kidneys, for example, which are capable of exerting a so-called vital secretory action on chlorides, etc. (not necessarily, so far as our present knowledge is concerned, in direct accord with the laws of osmosis), resulting in an interference with its normal function, its degree of viscosity and permeability, is a problem still open to investigation. These and many other possibilities must eventually be carefully considered, but bearing in mind the innumerable observations in cancer cases of interference with the secretions of the stomach, of increase in the chlorides and diminution in the alkalinity of the blood, of increase in the osmotic pressure of blood (Engelmann) and tissues (Hemmeter), of changes in proportion of salts in the tissues, of the production of œdematous fluids and of the diminution in the secretion of chlorides and variation from the normal rise and fall of chlorine secretion in the course of the day (Alb. Müller), it seems a matter of the first importance to throw as much light as possible upon the nature of the interference exerted in such cases, especially in view of the recent work on blood showing the role played by chlorine ions in the processes of oxidation and removal of waste products from the cells. The further possibility of variation in the proportion of potassium, sodium and calcium and other ions having a direct effect upon the proliferative tendencies of certain cells (referred to above) gives an added importance to the frequently ignored problem of salt equilibrium.

The main objects of our investigation have been as follows:

(1) To determine whether the change in weight of cancer patients was associated with a corresponding loss or gain of nitrogen by the system, and if so to what extent such results compared with those obtained from the study of normal individuals.

(2) To compare the chlorine of the food with that of the excreta with a view to discovering whether any absorption of chlorine by the body takes place, and if so to what extent.

(3) To determine whether the balance of chlorine retained in the system obtained by deducting the amount present in the excreta from that present in the diet possesses any direct relationship to the supposed increase in the chlorides of the blood and the formation of œdematous deposits; or whether the assumption of a diminished chloride dissociation can be made to account for the phenomena observed.

(4) To study the effect of adding or totally excluding chlorides from the diet as compared with the effect of such a treatment upon a normal individual.

The analytical methods employed were nitrogen by the Kjeldahl process, sodium chloride by the Salkowski or Moraczewski method, ammonia by the procedure of Schlösing, uric acid by the Hopkins method, phosphates by titrating with uranium nitrate solution and other constituents of the urine as described in the text.

METABOLISM EXPERIMENTS.

CASE I. NORMAL INDIVIDUAL.

The absence of accurate data in the literature regarding the influence of varying proportions of chlorides and other salts upon the metabolism of normal individuals rendered it advisable to carry out a series of experiments on one of ourselves which might afford a basis for comparison with some experiments made on individuals suffering from cancer. Dr. G.; physician; age 32; weight 66 kilo; health normal, received for two separate periods (one of 13 days, the other of 9 days) a diet in which the exact amounts of nitrogen and chlorine were carefully determined. In addition variations in body weight were recorded and the total volume, specific gravity, nitrogen, chlorine, phosphorus, uric acid and ammonia of the urine and the nitrogen and chlorine of the fæces were estimated. For the first five days a comparison of the nitrogen content of the food and excreta showed that a state of equilibrium might most readily be maintained on an average consumption of proteid containing from 13 to 14 grams nitrogen per diem. For the remainder of the first period and the second period considerable variations in nitrogen and chlorine content of food were accompanied by corresponding variations in the proportions of those substances in the excreta. The tendency to establish a state of osmotic equilibrium may most readily be recognized by drawing curves representing the variations in body weight, nitrogen and chlorine of the food and nitrogen, chlorine, uric acid and ammonia of the urine recorded in Table I. The weight of the body was found to be far less affected by the variations in nitrogen than by those in chlorides. Any large increase in the amount of proteid food consumed in excess of 14 grams nitrogen was apparently only partially removed by the urine, and whilst an increased amount was eliminated by means of the fæces, a considerable portion was apparently retained in the system. For the last two days of the first period a considerable reduction of the proteid of the diet (showing respectively 9.1 grams and 5.1 grams nitrogen in the food), led to interesting results. Whilst the reduction of the food from about 13½ grams to 9 grams nitrogen led to a fall of the total nitrogen of urine and fæces from about 13½ to 11.3, a reduction of the total nitrogen of the food to 5.1 in the last day was accompanied by a total nitrogen excretion of 9.3 grams. An examination of these figures shows that the reduction in the nitrogen of the food is accompanied by a proportionate loss in nitrogen on the part of

TABLE I.

First Period.

DATE.	Nitrogen in food.	Nitrogen in urine and fæces.	Sodium chloride in food.	Sodium chloride in urine and fæces.	Body weight in kilgms.	Uric acid.	Ammonia.
January.							
24–25	14.0	14.1	......	......	65.9	.58	......
25–26	15.3	15.0	......	......	65.1	......	......
27–28	12.4	13.5	7.9	8.1	65.4	.33	.87
28–29	15.5	13.7	8.1	7.9	66.1	.34	.80
29–30	13.9	15.9	27.6	20.0	66.4	.74	.63
30–31	13.9	14.2	23.0	23.6	66.5	.51	.81
31–1	17.6	14.6	12.1	17.6	66.1	.46	.76
1–2	13.0	13.1	2.0	9.5	65.1	.33	.78
2–3	9.1	11.3	1.3	3.8	64.3	.36	.60
3–4	5.1	9.2	9.3	5.4	64.7	.46	.56

Second Period.

DATE.	Nitrogen in food.	Nitrogen in urine and fæces.	Sodium chloride in food.	Sodium chloride in urine and fæces.	Body weight in kilgms.	Uric acid.	Ammonia.
March.							
30–31	12.2	10.7	......	......	66.7	.48	......
31–1	15.4	17.6	32.2	26.5	66.7	.67	.91
1–2	12.8	13.2	30.3	27.8	67.5	.52	.83
2–3	14.0	14.1	7.8	12.8	67.0	.43	.97
3–4	11.4	13.9	6.5	9.7	66.7	.46	.76
4–5	11.6	13.9	4.1	6.8	66.4	.47	.84
5–6	12.1	12.8	6.6	6.3	65.8	.38	.69
6–7	8.2	11.3	13.7	10.6	65.7	.43	.82
7–8	6.6	11.3	3.8	7.6	66.0	.35	.57

the body, but that the loss in question is not equal to the difference between the nitrogen of the food for the day in question and the normal, but about one-half of that quantity. During the greater portion of the second period the nitrogen of the food was maintained on a fairly low level. For the first four days an average consumption of about 13.6 grams nitrogen was accompanied by a corresponding loss of 13.8. The following three days on which the nitrogen of the food was still further diminished to an average of 11.7 showed an appreciable loss of body proteid, the average of the urine+fæces being 13.5. On the last two days an average of 7.4 nitrogen in the food was associated with an excretion of 11.3 grams nitrogen, or a difference of nearly 4 grams derived from body tissue. In this case, as in the first period, it will be observed that the loss of body proteid is not equal to the difference between the nitrogen of the food consumed in the period in question and the normal average amount for a corresponding period, but represents a certain proportion of that amount, in this case rather more than half.

Owing to the difficulty of carrying such experiments further it was not possible to test the effect of still further diminishing the proteids of the food or entirely removing them from the diet for the space of another day. The figures obtained by producing curves would indicate that the amount of nitrogen lost daily in a state of absolute starvation would be from 6 to 7 grams (or .1 gram per kilo) thus exceeding the figures 3 to 5 grams given by Klemperer and Blumenthal. They would on the other hand be lower than those obtained on Cetti by Senator, Zunz, etc., which are considered to have been abnormally high, owing to the toxic influence of the tuberculosis from which it was discovered that Cetti was suffering.

These normal experiments and a second series on a case of cardio-spasmus, which will be referred to later, justify the assumption that the daily loss of an individual weighing 66 kilos would be from 6 to 7 grams in a state of absolute starvation provided no toxic influences were concerned; consequently the loss of nitrogen per kilo of body weight in excess of .1 gram per diem may be attributed to the influence of toxic agencies, a point which will be referred to at a later stage in considering the metabolism of cachectic individuals.

Under normal conditions the sodium chloride of the food and of the urine lay apparently between 7.5 and 8 grams per diem. On raising the total sodium chloride of the diet in the course of one day from 8 grams to 27.6 only 19.3 was excreted from the kidneys which, with .7 in the fæces, gives a total of 20.0, thus showing a gain of 7.6 grams by the body. The following day the consumption of 22.99 grams sodium chloride was accompanied by a loss of 22.8 in the urine and .7 in the fæces, giving a total of 23.6 for the excreta. A practical balance was thus established on this day. On the following day, when 12 grams only were consumed, a total of 17.6 was eliminated, the body thus tending to recover its normal chlorine equilibrium, a result which was completely effected on the following day when, starving the patient of chlorides, only two grams being introduced into the diet, as much as 9.5 grams was still excreted. A still further reduction in the chlorides of the food to 1.3 on the following day was accompanied by a loss of 3.5 in the urine, or a total of 3.78 in urine and fæces, thus showing a still further loss on the part of the body of salt. The following day ended the first series of experiments with an increase in the consumption of salt to the normal figure, about 9.2 grams, and a loss of only 5.3, showing a tendency on the part of the system to retain chlorides in order to replace those which had been secreted during the previous period of chlorine starvation. Very similar results are to be observed in the second period, 32.2 and 30.3 grams in the diet the first two days being associated with a loss of 26.5 and 27.8, showing a retention of 5.7 and 2.5 grams, or a total of 8.2. On the two following days a reduction of the chlorides of the diet to quantities slightly below the normal was accompanied by a loss of 5 grams and 3.2 grams respectively, or a total of 8.2 grams, thus showing an exact balance of chlorides for the first four days. On the fifth day a reduction of the sodium chloride of the diet to 4.1 grams was associated with a loss of 6.8 grams, thus showing a loss of salts on the part of the body. The same interesting tendency to maintain a balance is to be noted to the extreme end of the series, the sum totals of intake and output of chlorides being for the entire period almost identical. The chlorides retained in the fæces normally amounted to .2 grams daily, but on those days on which large quantities were consumed an increase to .71 and .77 respectively was noted. In view of a recent publication to the effect that the chlorides only pass by way of the fæces after 24 hours, it is interesting to note that the almost full effect of the large doses of chlorides were observed in the space of the first 24 hours after their administration, and that without any accompaniment of diarrhœa. The effect of large consumption of NaCl on the nitrogen excretion is marked, the maximum loss of nitrogen in each period being associated with the maximum consumption and excretion of chlorides.

The body weight was found to vary directly with the amount of chlorides consumed, or more strictly, those retained in the system. In the first period the maximum of weight, 66.4 to 66.5 kilos, was observed in the course of the two days on which the largest amounts of sodium chloride were consumed and 7½ grams retained in the body. The gradual diminution of the amount of chlorides in the diet, with a gradual increase of the proportion of chlorides excreted until the latter were considerably in excess of the former, led to an exactly corresponding decrease in the weight of the individual. The minimum weight observed in the series of experiments, 64.3 kilos, was reached on the day of maximum chloride starvation, the day on which 1.3 grams only of sodium chloride was consumed in the food and 3.8 excreted, following the day on which 2 grams in the food had been accompanied by a loss of 9.5 grams. The total loss of weight between the maximum and minimum points, slightly in excess of 2 kilos, was accompanied by a loss of chlorides amounting to more than 15 grams, which would fully account for that difference in weight, assuming that a .75 to .8 per cent sodium chloride solution were isotonic with the serum. The following day a considerable increase in the salt of the diet was accompanied, as would be expected, by a retention of that substance in the system previously impoverished and consequently an increase in weight of the body was observed, although at the moment a considerable diminution in proteid in the diet accompanied by a loss of nitrogen would normally have led to a loss of weight.

In the second period the balance is even more exact. At first the retention of 5 or 6 grams sodium chloride is accompanied by an increase in weight of .8 of a kilo to a maximum of 67.5. Subsequently a fall in weight to 65.8 was accompanied by a loss of sodium chloride of nearly 11 grams. In this period also the actual loss of nitrogen on the part of the body produced an insignificant effect upon the body weight as compared with the variations in chlorides. A comparison of the volumes of water ingested and excreted shows on the average a preponderance of the former over the latter by 500 or 600 c.c. On those days on which large quantities of salt were consumed the volume of fluid ingested was about two liters and that excreted about 1300 c.c., the big secretion of sodium chloride being accompanied by a corresponding increase in total volume of urine, the specific gravity never rising above 1.023 to 1.022. On only one day in the series was the total volume of the urine in excess of the volume of water ingested, the day on which chlorides being reduced to a minimum in the diet, a large excess of salt in the system was removed in the urine.

It will thus be seen that the data bearing on body weight and intake and output of water correspond exactly with the variations in the proportions of chlorides of the diet and excreta. An investigation of the chloride figures makes it appear probable that a period of 48 hours frequently elapses before chloride equilibrium is completely established in the system, but such an equilibrium is effected very readily in contrast to the pathological cases referred to subsequently.

Effect of variations in the proportion of chlorides upon other constituents of the urine.—On those days on which the normal amount, about 8 grams of sodium chloride, was consumed in the food and excreted in the urine, the nitrogen of the urine was about 12.5, the phosphates, estimated as P_2O_5 about 2.5, and the uric acid .33 to .34 grams, the ammonia about .6 grams. A great increase in the amount of salt in the diet led to a great increase in the total volume of the urine, a slight increase in the total nitrogen excreted, an increase in the phosphates and a very large increase in the amount of uric acid, with a slight decrease in the ammonia. The uric acid results are most instructive. Two days of a normal salt diet with a uric acid secretion of .32 and .34 grams were followed by three days on which an abnormal amount of salt was consumed and gradually excreted by the kidneys, on which days respectively .74, .51 and .46 grams of uric acid, giving an average of .57 grams per diem, were removed. It will thus be seen that during the period of large salt consumption and increased excretion of water and chlorides either an increased destruction of the nucleus of cells was brought about, leading to an increase in the excretion of uric acid, or a more complete removal of the latter substance from the circulation was effected, owing to a great increase in the amount of water and salts. This latter theory is in accord with the results published by one of us on the freezing point of the urine, which indicate a probable relationship between the excretion of small ions and of large complexes such as uric acid. Following the uric acid table further, it is interesting to note that in the next two days of chlorine starvation the quantity of sodium chloride excreted adjusts itself to the normal and is accompanied by normal amounts of uric acid .33 and .36 respectively. On the last day where the factor of starvation has to be considered an increase in the amount of chlorides and partial starvation led to an increase in the amount of uric acid, .46 grams being removed. Similar results were recorded in the second period.

The excretion of ammonia appears to be much less affected than is that of uric acid by the variations in proportions of sodium chloride, but the first day on which large quantities of salt were excreted shows a diminution in the amount of ammonia, and it may be said that, generally speaking, a slight fall in the ammonia in proportion to the total nitrogen appeared to take place when large doses of salt were employed.

Throughout these series of experiments and in spite of large variations of chlorides the relationship of the freezing point to the specific gravity was found to be far more constant than would be anticipated.*

Analyses of the nitrogen and sodium chloride content of the blood were made on April 1st at the point of maximum salt assimilation and on April 5th at a stage of salt starvation:

	Nitrogen.	Sodium Chloride.
April 1st	3.01	.402
April 5th	3.43	.427

From which it will be seen that whilst the nitrogen is greater on April 5th, the proportion of sodium chloride to nitrogen is higher on April 1st.

The effect of chlorides tending to produce œdema when administered in large doses.—The increase in body weight to a maximum under the influence of large quantities of sodium chloride and its fall below the normal on reducing the salt in the diet to a minimum whilst the proteid consumption was maintained at a fairly constant level and the nitrogen equilibrium of the system underwent practically no change, has been referred to in the discussion of the body weight and chloride balance. It was further shown that the loss of chlorides suffered by the body between the maximum and minimum weights corresponded fairly well with the difference in weight, on the assumption that a salt solution almost isotonic with the blood serum was being removed from the body. It was also noted that the variations produced by changes in the chlorides were so much more marked than those brought about by reduction or increase of the nitrogen as to entirely mask the effects of the latter on the body weight.

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*See "The relationship between the freezing point depression and specific gravity of urine, under varying conditions of metabolism, and its clinical value in the estimation of sugar and albumin," by G. H. A. Clowes, American Journal of Physiology, Vol. IX, July 1, 1903.

It is interesting to note the space of time required by the body of a healthy individual to bring about a chloride equilibrium, the figures recorded showing that this may be accomplished in from 24 to 48 hours, a point which will be referred to subsequently in carrying out some experiments on œdematous pathological cases.

*Case II. Carcinoma of the Pylorus.

J. W.; age 75; weight 51 kilo.; widower.—Gives no definite history of duration of disease. Has for months past experienced considerable difficulty in taking food. Is very much emaciated and very cachectic and is not sufficiently intelligent to give a reliable account of himself. Examination shows prominent tumor on inspection in the epigastrium, which on palpation is hard, immovable and seems to involve not only the pylorus but the tissues about it. Patient is very feeble.

Death occurred on April 2, 1903, and the autopsy revealed the following conditions: On opening the abdomen about 300c.c. of turbid fluid was found in the region of the stomach and spleen. No general peritonitis was observed. A large tumor mass, irregular in shape, involving most of the pancreas, the entire pyloric end of the stomach and one-third of its greater curvature, was found. The size of the mass was about that of two fists. Neither duodenum, liver nor any other abdominal organ was involved. On section the pylorus showed a very small opening into the duodenum and a surface as large as a man's hand of tumor tissue ulcerating and necrotic. Pathological examination confirms diagnosis of carcinoma of pylorus with metastases involving the pancreas.

For a period of twelve weeks analyses were carried out on the complete 24-hour specimens of urine and fæces. For the eight weeks immediately preceding death the total nitrogen and chlorine in the food were estimated from day to day. During this latter period the patient was for the most part on a liquid diet, which considerably facilitated compilation of data. The principal objects to be gained by this series of experiments were (1) a comparison of the nitrogen and chlorine of the food and excreta over an extensive period immediately previous to the decease of the patient; (2) the influence of varying proportions of sodium chloride in the diet; (3) a comparison of the relative

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*We are indebted to Dr. Matzinger of the Laboratory staff for the histories and autopsies on this and subsequent cases, III, IV, V and VI.

proportions of various nitrogenous constituents, phosporus, chlorine, etc., in the urine, under the varying conditions that obtain at various stages in the development of the disease.

1. *Nitrogen and Chlorine Equilibrium.*

The results obtained have been tabulated in weekly periods showing the intake and output of nitrogen and chlorides as Na Cl and the gain or loss of these substances experienced by the body for each period (see Table II). An examination of the table shows that for the first two weeks the body was practically in a state of nitrogen and chlorine equilibrium, a total of 91.4 grams of nitrogen being assimilated and the same amount excreted, whilst 26.0 grams of chloride in the food corresponded fairly well with 25.0 in the urine and fæces without any appreciable loss being experienced in body weight. During the succeeding week, from the 18th to the 26th, 14 grams of nitrogen were lost and 2.8 grams of chlorine retained by the body, the condition of the patient showing a marked falling off. In the three succeeding weeks the body suffered a steady loss of nitrogen and exhibited an ever-increasing tendency to retain chlorine, till finally, in the 14-day period immediately preceding death, whilst the nitrogen loss was 33.7 grams, the retention of sodium chloride amounted to as large a quantity as 22.8 grams, only 3.5 grams being eliminated in the urine out of a total of 26.3 contained in the food. That is to say, over 80 per cent of the chlorine assimilated with the food remained in the

TABLE II.

	Nitrogen in food.	Nitrogen in urine and fæces.	Loss or gain, nitrogen.	Chlorine in food.	Chlorine in urine and fæces.	Loss or gain, chlorine.
Feb. 4–11	45.0	49.0	— 4.0	11.8	11.7	+ .1
11–18	46.4	42.4	+ 4.0	14.2	13.3	+ .9
18–26	36.5	50.6	—14.1	13.0	10.2	+ 2.8
26–Mar. 5	32.9	40.2	— 7.3	8.8	4.7	+ 4.1
Mar. 5–12	45.9	50.4	— 4.5	12.2	4.0	+ 8.2
12–19	38.1	56.0	—17.9	13.2	6.0	+ 7.2
19–26	30.0	40.9	—10.9	17.8	2.0	+15.8
26–Ap. 2	21.6	44.4	—22.8	8.5	1.5	+ 7.0

system. In the course of the week period, from March 19th to 26th, for the space of 48 hours the amount of sodium choride in the food was considerably increased in hopes of producing an increased elimination of chlorine, and with it the products of metabolism and suboxidation to which toxic effects at that time observed in the patient might be attributed, but the only result obtained by this treatment at so late a stage was an increase in the œdema of the patient. The total of the eight weeks shows a net loss of 77.5 grams of nitrogen and a gain of 46.1 grams of sodium chloride. There are, of course, in such work innumerable sources of experimental error due principally to negligence on the part of those whose duty it is to keep an exact record of the amount actually consumed by the patient in the course of 24 hours, but having due regard for the influence exerted by all such possible causes of error there can be no doubt that whilst a heavy loss of nitrogen was suffered by the system during the last six weeks, a correspondingly large retention of chlorine must have taken place. The loss of 77.5 grams nitrogen would correspond with a loss in weight of 2¼ kilo on the part of the patient whilst the retention of 46.1 grams of sodium chloride, if present in the form of œdematous fluid throughout the body, should involve a retention of a very large amount of water, at least four to six liters, and to about 40 grams of nitrogen which would otherwise have been eliminated. A certain proportion of the chlorides in question undoubtedly were present in such fluids, for especially during the last 25 days a very marked œdema of the extremities was to be observed, and at the autopsy large quantities of fluid were found in the peritoneal and pleural cavities as well as a very considerably enlarged liver and spleen, but it is scarcely possible that the retention of such a large amount of chlorine salts can be explained on the above basis, and it is highly probable that the presence of suboxidation nitrogenous products capable of forming double compounds with sodium chloride and thereby materially interfering with its dissociation in solution may account for a considerable portion of the discrepancy. It is also probable from analyses made on the tumor and other tissues that an increase of chlorides had taken place not only in the blood and body fluids but also in the tissue cells, more especially those involved in the tumor. Analyses of blood serum taken from the heart within six hours of the death of the patient and of fluids of the brain, the pleural and peritoneal cavities showed on analyses a chlorine content varying from .38 per cent to .4 per cent; the freezing points from .61 to .64° C., both of which quantities are considerably in excess of the normal.

2. *The Influence of Variations in the Quantities of Chlorides in the Diet.*

An inspection of the figures Table II will show that the patient was practically in a state of chlorine starvation, the daily average amount being little in excess of a gram of chlorine, or 1⅔ grams sodium chloride. The experiment in the course of the week, March 19-26, during which the amount of chlorides in the diet was increased to the extent of several grams, has already been referred to. During this period the chlorides to the extent of 15.8 grams were retained in the system, and in spite of a loss of nitrogen an increase in body weight of a kilo and a quarter, accompanied by a great increase in œdema, was to be observed. It is interesting to note that during this period the nitrogen loss was less than in either the preceding or following weeks, a fact which may presumably be attributed to the retention of nitrogenous waste products in the œdematous fluids. On once more reducing the chlorides to a figure lower than in any previous week the increase in œdema was no longer as marked, but the death of the patient at the end of the week in question brought the series of experiments to a close.

3. *The Relative Proportions of Nitrogenous Constituents, etc., in the Urine.*

Since this question will be dealt with in detail in a subsequent portion of the report dealing with the diagnosis of cancer by means of the urinalyses it will not be necessary to give any

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[Note.—The secretion of the skin should not be entirely neglected, as the proportion of chlorides eliminated in that manner is much larger than is that of other constituents in comparison with the urine. See p. 100].

figures at this stage. A table has been prepared showing the relationship of uric acid, ammonia, chlorine and phosphorus to the total nitrogen in weekly periods. A steady gradual rise in the proportion of uric acid nitrogen to total nitrogen, a considerable fall in proportion of chlorine to nitrogen with a fairly steady ammonia and phosphorus proportion is to be noted.

CASE III.

Mr. U.; age 60; weight 75 kilo.; German; married; occupation brewer.—No family history of cancer. Personal history good. Consumed much beer but was not intemperate. About one year ago patient began to complain of vague pain, high up in the epigastric region, which continued with some remissions and became more and more troublesome. Very soon distinct symptoms of stenosis of the œsophagus developed, such as pain in the chest on swallowing, increasing difficulty in getting solid food through and later regurgitation of food immediately after swallowing. The pain also increased and became more continuous, and six months later definite diagnosis of carinomatous stenosis of the œsophagus a few inches above the stomach was made by his physician. Difficulty in swallowing even soft foods became more marked until finally only liquids could be passed through with difficulty. Frequent attempts at dilatation of the stricture were unsuccessful. Location of the cancerous involvement was made out definitely by œsophageal sounds. August, 1903, the occlusion was complete, so that not even liquid foods passed into the stomach and starvation was imminent. Patient suffered more from the extreme thirst than from hunger, and insisted on an operation which would give him at least relief from these symptoms. A gastrostomy was then performed and the operator was unable to discover any disease of the stomach. At the time of this examination patient has for over two months been fed through the fistulous opening. On inspection he shows no emaciation or marked cachexia. He has great difficulty in breathing and coughs violently at every attempt at speaking. This feature of his illness he complains of most. He is quite helpless and feeble, complains of headache and confusion due in part to constipation and in part to the regular use of morphia which is prescribed for the relief of pain. Physical examination shows a fairly well nourished body. Ascultation of the chest reveals no great abnormalities of the heart, but it is somewhat weak and rapid and irregular beat. In the lungs the larger bronchi are full of secretions on both sides. Rales, wheezing and shallow breathing in both; signs of pleurisy, or solidification of lung substance. Palpation of the abdomen reveals an enlarged liver pushing far over the stomach with no distinguishable signs of tumor but giving much pain on pressure, especially in the epigastric region. There is a considerable cushion of abdominal fat which makes accurate diagnosis difficult.

Course of the disease.—Patient was under observation five weeks. As stated above, he was, when first seen, dull, emotional and markedly toxic due at least in part to overfeeding of eggs and meat and a constipated condition with much flatus favored by the regular use of morphia to produce sleep and to relieve obstinate cough. A brisk cathartic had been given by his physician, and at our suggestion the amount of meat and number of eggs fed during the twenty-four hours was reduced, while more vegetable food was added so that the total nitrogen content of the meals averaged 9.5. A small dose of Carlsbad salt was prescribed to be taken every morning for a week, and his stomach was washed out four hours after each meal. When test meals were given the stomach was again washed out immediately before feeding and the food allowed to remain an hour and a half to two hours. This change was followed by marked improvement so that less sedative was required; sleep became more normal and the bowels more regular; there was less flatus and less cough. A marked improvement was also noticeable in the general appearance and conduct of the patient. He increased in weight, his color was better, he was clearer in his head, was less emotional and irritable and much stronger. At the end of two weeks he sat up most of the day, was bright and active mentally, read part of the time and was able to walk about and go out of doors on good days. This condition continued until the last week of patient's life, when increasing difficulty in breathing again became prominent, with much cough and need for sedatives and expectorants. The bowels became troublesome, toxic symptoms supervened, the heart became weaker and pulse more rapid. At the same time cachexia became marked with rapid emaciation and increasing weakness. He soon fell into a semicomatose condition and died on November 17, 1903.

Death occurred November 17, 1903.—Autopsy the following morning revealed the following conditions: The skin about the fistula was puffy and full of granulations, but with no appearance of cancerous involvement. On opening the chest the lung tissue was found normal, but there were slight pleuritic adhesions at the base of both lungs. Nothing unusual about the heart. Bronchial glands slightly enlarged and pulpy. Three inches of the œsophagus, immediately above the diaphragm, consisted of a large tumor mass completely occluding the lumen of the tube. The mass was about an inch and three-quarters in thickness and when opened was full of necrotic tissue. The cardiac end of the stomach was normal. The pylorus and the entire upper portion of the stomach showed nodules of various sizes beneath the mucosa, but no ulceration. The pancreas was normal. A few of the mesenteric glands were slightly enlarged. The liver was large, extending below the ribs and a considerable distance over the pyloric end of the stomach and contained numerous large foci of cancer varying from the size of a pigeon's egg to that of a pea. Other abdominal organs were normal.

For a period of six days exact analyses were carried out on the food and excreta with a view to determining the point of nitrogen and chlorine equilibrium, also the influence of an excess of chlorides administered in conjunction with the diet. The patient received three meals a day in the form of a semiliquid vegetable soup to which a small proportion of meat had been added. The principal object of this series of experiments was to observe the effect produced upon the general condition of the patient, the excretion of urine, more especially of nitrogen, ammonia, uric acid and phosphates, employing the diet referred to above as being most favorable, but for one period reducing the consumption of salt (NaCl) to a minimum, and in a second period increasing the amount of salt taken with the food to a quantity far in excess of the normal.

The accompanying Table III gives a comparison of the nitrogen and chlorine of the diet with the nitrogen, chlorine and uric acid of the secretions.

Table III.

DATE.	Nitrogen of food.	Nitrogen of urine and fæces.	Chlorine of food as *NaCl*.	Chlorine of urine and fæces as *NaCl*.	Uric acid.
Oct. 20–21............	9.58	8.11	.98	3.88	.46
21–22............	9.02	9.20	1.73	3.25	.45
22–23............	9.04	7.63	1.88	1.49	.35
24–25............	9.74	9.28	8.20	3.43	.38
25–26............	9.73	8.50	9.89	7.96	.70
26–27............	9.43	8.10	9.95	6.70	.52

The total volume of urine excreted in the first three-day period of small chlorine consumption was found to be extremely large, being about six liters. In the second period, when large quantities of salt were present in the diet, the total volume of urine was less than four liters, pointing towards a probable retention of fluid in the tissue, which was indicated to a certain extent by a slight increase in the œdematous condition of the patient.

The total nitrogen secreted in the urine showed practically no difference for the two periods. In the first 22.8 grams were eliminated and in the second 22.75; thus showing that the reduced volume of urine had not materially affected the removal of nitrogenous products. To the nitrogen secreted with the urine must be added that which was found in the fæces, amounting in the first period to 2.1 and in the second to 3.1 grams, giving totals of 24.85 and 25.9 respectively, which, when deducted from the nitrogen of the diet, 27.75 and 28.9 respectively, give differences of 2.9 and 3 grams, or an average retention by the system of one gram of nitrogen per day, which must be attributed to the improved state of the patient and possibly to a certain extent to the increase in œdema; but it is interesting to note that the amounts retained are exactly the same for the two periods in spite of the much larger retention of water and salt in the latter period.

Whilst in the first three-day period the total sodium chloride consumed with the food was only 4.6 grams, the sodium chloride secreted in the urine was equal to 8.24 grams and that of the fæces to .4 grams; in the succeeding three-day period, when the chlorine of the food equaled 28 grams, the amount secreted in the urine was only 17.64 grams and that in the fæces .45 grams, showing a marked tendency on the part of the system to maintain a chlorine equilibrium more or less following the laws of osmosis between the chlorides of the system dissolved in the blood, tissues, etc., and those of the kidney secretions. An examination of the amounts lost from day to day emphasizes this point, a fall to a minimum being observed at the end of the starvation period and a rise to a maximum in the course of the following three days of chlorine excess. But it should be observed that the total amount eliminated from the system in this period of time was only 26.7 grams, whilst 32.6 were introduced with the food. This tendency to retain a portion of the chlorine, taken in conjunction with the less marked retention of nitrogen referred to in the last section, may possibly be attributed partially to the increase in cancer tissue and to œdema, but also probably to a considerable extent to its association with products of suboxidation retained in the system.

The ammonia secretion in the first period was very large, reaching a total of 4.1 grams as against 1.75 in the second period, showing a marked improvement in the presence of large quantities of chloride.

The removal of uric acid and other bodies capable of reducing permanganate was, on the other hand, found to be larger in the second period than during the first. Whilst in the first period, with a limited chlorine diet and in spite of the large volume of the urine, only 1.26 grams of uric acid were removed, in the second period 1.6 grams were excreted with the urine.

Phosphates, which were absolutely constant in the diet, were also found to be practically constant in the urine and fæces, showing an average from 2 to 2.2 grams H_3PO_4 per diem.

An analysis of the blood showed a freezing point .57° and sodium chloride content .47 per cent, both of which are practically normal.

To summarize the results in this case it may be said that in the absence of toxic symptoms a practical equilibrium of nitrogen is established and a small tendency to retain chlorides exhibited.

CASE IV.

Mr. T.; age 66; Scotch; married.—Patient gives no family history of cancer or of tuberculosis. He has not had specific disease but has been intemperate. He gives an indefinite history of ten years' illness, referred particularly to the abdomen and kidneys. For the last few months he has had frequent urination, and the specimen contained varying quantities of blood. In the past year he has lost weight progressively and for the past five months has been confined to bed.

Patient died January 17, 1903, at the Buffalo General Hospital, and autopsy revealed the following conditions: Very marked emaciation. On opening the chest the right pleural cavity showed several large tumors the size of a plum, with cancerous disease of several ribs on the same side. The lung tissue was quite normal, and the bronchial glands were not diseased. In the abdominal cavity the lymph glands beneath the peritoneum were enlarged and hard. The stomach was free from cancerous change. The liver showed in the upper portion of the right lobe a slight metastatic carcinomatous growth. The mesenteric glands were not noticeably changed. The left kidney was large and soft while the right kidney was the seat of a large primary, carcinomatous tumor.

In this case a balance of the nitrogen and chlorine of the food and excreta was carried out for the nine days immediately preceding the death of the patient (see Table IV). The diet consisted exclusively of one or two eggnogs daily, the exact nitrogen and chlorine content of which was known. For two days a slight increase in the salt of the food was not associated with any considerable increase in that of the urine, but patient showed more marked œdema and became extremely cachectic. An examination of the table will show that whilst a steady loss of nitrogen was exhibited for the entire period, there was a strong tendency to retain chlorides in the system, and, as stated above, a slight increase in the chlorides of the food did not lead to greatly increased excretions and simply tended to accentuate the œdema of the patient. The uric acid nitrogen in comparison with the total nitrogen of the urine was high, varying from 1.7 to 2 per cent. The ammonia was above the normal from 5 to 8 per cent. In this case, in which the functions of the kidneys were materially interfered with, we have a marked illustration of the toxic symptoms associated with a considerable loss of nitrogen and a tendency to retain chlorides.

TABLE IV.

	Nitrogen of food.	Nitrogen of excreta.	Chlorine of food as *Na Cl.*	Chlorine of excreta as *Na Cl.*
8–9	5.1	8.3	2.0	.32
9–10	5.1	8.6	2.0	.32
10–11	5.1	10.5	2.0	.62
11–12	2.6	3.9	1.0	.08
12–13	5.1	5.4	2.0	.33
13–14	5.1	6.3	3.6	.55
14–15	5.1	6.8	3.6	.82
15–16	5.1	7.1	2.0	.45
16–17	2.6	4.5	1.0	.10
Total	40.9	61.4	19.2	3.59

CASE V.

Mr. C.; age 75; weight 65 kilo.—Sarcoma of skin and connective tissue. Patient presents a nodular discolored area in right epigastric region having a maximum diameter of six inches. Numerous tumor nodules, some of them as large as a walnut, apparently seated in the skin and the subcutaneous tissue, in the discolored area. Patient refused to submit to operation and left the hospital at the completion of the series of experiments. Whilst exhibiting toxic symptoms, his appetite was normal and nutrition apparently unaffected. For the twelve days that he remained in the hospital he received a diet containing approximately 11½ grams nitrogen and 8 grams sodium chloride per diem.

The analyses of urine and fæces were conducted with as great accuracy as those previously referred to, but in the diet a possible source of error is introduced, since analyses were only carried out on two days in the course of the experiment, giving 11.3 and 11.6 grams nitrogen and 8 and 8.1 grams sodium chloride respectively; on the remaining days the food being weighed to correspond as nearly as possible to the same amount. Our principal reason for including this case is the evidence which it affords of both a nitrogen and chlorine balance, even in the presence of a tumor which has reached considerable dimensions and in spite of marked toxic symptoms, provided the digestive organs are unaffected. A slight gain of nitrogen was apparently effected during each period, and the chlorides determined for the second six days showed a similar close relationship (see Table V); all of which corresponds with the body weight of the patient, which remained constant throughout the experiments. It is also interesting to note that in this case the uric acid nitrogen was averaging 1.4 per cent of the total nitrogen.

TABLE V.

Day.	Total nitrogen of food.	NITROGEN OF		Sodium chloride in food.	SODIUM CHLORIDE IN	
		Urine.	Fæces.		Urine.	Fæces.
1..	Approximately	9.4	for six days.	....	....	....
2..		7.3		....	....	....
3..		9.4		....	....	....
4..		10.7		....	....	....
5..		8.1		....	....	....
6..		10.1		....	....	....
	69.0 to 71.0	55.0	10.50			
		65.5				
7..	Approximately	10.1	for six days.	Approximately.	8.2	Only traces; disregarded.
8..		9.0			6.7	
9..		9.3			8.1	
10..		9.1			8.2	
11..		9.8			8.2	
12..		10.5			9.5	
	69.0 to 71.0	57.8	9.7	46.0 to 48.0		
		67.5			48.9	

The analysis of the blood showed 2.5 per cent nitrogen and .48 per cent NaCl.

To summarize results in this case it may be said that, in spite of the age of the patient and the development of the tumor, practically no effect has been exerted on his nutrition, which is fully up to the normal standard of a healthy individual of his age.

CASE VI.

Mrs. N.; age 58; married; weight 44 kilo.—No family history of cancer or tuberculosis. The patient can give no definite account of the duration of the disease except that it existed about a year, and that after it was first noticed in the vulva it was of considerable size and progressed very rapidly, particularly so in the past three months. On examination there is found extensive tumefaction of the right labium, nodular, hard and ulcerating on inner surface. There are also some nodules on the left side but not large. The entire vagina and cervix are involved in the tumor mass. There is much necrotic tissue and a dark, very offensive discharge. The growth on the right side is about the size of a man's fist. There are metastases in the immediate neighborhood of the right groin and perineum, also quite a large nodule in the right buttock. Patient is very much emaciated, feeble, cachectic and much of the time unable to take sufficient food, this last condition being aggravated by her mental state of depression. She has much pain, so much so that anodynes are required to give her rest and sleep.

In this case analyses were made on the 24-hour specimens of the urine for 45 days. For 24 days estimations of nitrogen and chlorine in the food, in the urine and the fæces were also carried out, but owing to the difficulty of properly controlling the patient only one period of six days can be looked upon as reliable.

1. *Nitrogen and chlorine equilibrium.*—For the first twelve days complete failure to effect an approximate balance of the nitrogen and chlorine led to the discovery that the patient was deliberately throwing away a portion of the urine and fæces, so that results were obtained similar to those of Moraczewski, showing a retention of nitrogen and chlorine, at the same time an appreciable loss in body weight being observed. Such results being obviously incorrect, for a period of six days patient was carefully watched and a fresh series of experiments showed a nitrogen consumption of 48.6 grams and a nitrogen loss of 54.2 grams.

At the same time 36.1 grams sodium chloride had been consumed with the diet and 34.2 grams excreted in the urine. Even these figures failed to afford a satisfactory balance, a loss of 5.6 grams nitrogen and a gain of 1.9 grams sodium chloride being scarcely comparable with the actual loss in body weight during this period of .75 kilo. One possible source of error, the secretions of the skin, will be considered at a later stage, but it must be concluded that cases of this type are not suitable for metabolism experiments, owing to the difficulty of controlling the loss which takes place continually from the surface of the ulcerating tumor. On the other hand, the 24-hour analyses may be made use of to compare the relative proportions of nitrogen, uric acid, ammonia, chlorine and phosphorus. The uric acid nitrogen was found as an average of the 45 days to be 2.1 per cent of the total nitrogen; the ammonia nitrogen 12.5 per cent; phosphorus 7.4 per cent and the chlorine 40 per cent of the total nitrogen.

*Case VII.

P. G.; age 59; Polish.—Committed to Erie County Hospital March 14, 1904. Was found to be much emaciated; complained of inability to swallow solid foods but was able to take fluids. Examination with œsophageal bougies showed that there was some dilatation of the œsophagus and an obstruction at the cardiac opening. After several attempts, however, a moderately large bougie was passed into the stomach. He was kept under observation, and on May 21st a gastrostomy, typical Witzel, was performed. He was fed through the tube for about a fortnight, at which time the irritation in the œsophagus had so subsided that he was again able to swallow semisolid food with ease and some solid food. His condition steadily improved; he gained in weight and on June 15th tube was removed and shortly afterward the opening closed spontaneously. Patient's ability to swallow semisolid food and at times solid food remained unchanged until September, when he contracted lobar pneumonia, of which he died on October 5th.

The condition of the œsophagus on autopsy was shown to be slightly enlarged; there was no definite area of erosion or permanent stricture of the cardiac opening. The mucous membrane of the œsophagus was somewhat injected. The anatomical findings confirmed the clinical diagnosis of cardio-spasmus.

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*We are indebted to Dr. Gaylord of this Laboratory for above history and autopsy notes.

In view of the possibility that this was a case of cancer of the œsophagus a series of nitrogen and chloride determinations was carried out shortly after the operation had been performed. The patient's diet throughout this and subsequent experiments consisted of milk, with the addition of definite quantities of plantose (a vegetable albumen) and salt, meat broth and egg-nogs, which greatly facilitated the determinations of nitrogen and chlorine. The first series, *a,* as will be seen from the table, shows a distinct loss of nitrogen and fair equilibrium of chlorides. A heavy nitrogen loss at this stage must, however, be attributed to the shock of the operation and to the toxic effects of an infection which developed at the point at which the tube was introduced. A subsequent series, *b,* of nitrogen determinations carried out six weeks after the operation and previous to the development of pneumonia shows a very fair maintenance of nitrogen equilibrium. With regard to the chloride metabolism, it is interesting to note in series *a* that, whilst a heavy loss of nitrogen had taken place, probably owing to toxic influences, a very fair chloride equilibrium was maintained. There was no tendency to œdema, and the toxic influences referred to above apparently failed to exert such an effect upon the kidneys as to lead to a retention of sodium chloride.

TABLE VI.

Series a.

DAY.	Nitrogen of food.	Nitrogen of excreta.	NaCl of food.	NaCl of excreta.
1	12.5	15.7	5.5	4.8
2	11.4	18.6	4.2	4.3
3	12.3	16.6	6.3	6.4
4	12.8	17.7	4.3	5.7
5	12.6	16.9	6.8	6.9

Series b.

DAY.	Nitrogen of food.	Nitrogen of excreta.
1	14.0	14.3
2	13.6	10.4
3	13.4	15.9
4	13.9	13.3

Estimations of uric acid and ammonia as compared with the total nitrogen of the urine over an extended period showed very low uric acid and fairly high ammonia results, the uric acid nitrogen averaging less than .8 per cent of the total nitrogen, the ammonia nitrogen, especially during the toxic period, being as high as 10 to 15 per cent of the total nitrogen.

* Case VIII.

L. L.; age 44; weight 150 pounds; married.—Born in the United States of German parentage. Retired butcher. No family history of cancer or tuberculosis on either side. No personal history of syphilis or intemperance. Patient enjoyed ordinarily good health until the year 1897, when he states that he had an illness of two months duration characterized by much pain in the region of liver and marked jaundice, indigestion and fever. No evidence of gall stones. In April, 1904, had pain in the right hypochondria, but no vomiting, belching or other gastric symptoms. From July 1st experienced considerable difficulty in swallowing solids, and some with regard to liquids; belched gas and had small regurgitation of food with considerable mucus, but without noticeable color, odor or taste. At this time he suffered from sharp epigastric pain, which was almost continuous, and at the same time from constipation. A physical examination revealed nothing abnormal as to liver, stomach, heart, kidneys or appendix. On July 26th the œsophagus was sounded. The largest sized bulbs entered easily to a depth of 29 cm. from the incisors. Size 26 (French) entered to a depth of 30 to 31 cm., varying according to force employed but could not be inserted lower than 31 cm. Size 22 passed the stricture with some difficulty and it was thus determined that the lower œsophagus was sufficiently large to accommodate this bulb below a point 33 cm. from the incisors. On August 8th an X-ray examination was made, but revealed nothing as to the cause of stricture. On October 11th an attempt was made under ether to inspect the stricture by means of the speculum, but on account of a stoop of the shoulders it was not possible to straighten the spinal column sufficiently. At various times œsophageal bulbs were passed corroborating the results of the first examination and showing neither increase nor abatement of the stricture. No blood nor tissue was at any time found, the microscopical examination revealing nothing but epithelial scales and food remnants. Patient had lost weight considerably previous to the 26th of July, on which date he weighed 150 pounds. The experiments in metabolism referred to later were carried out between the first of August and the middle of October, at which time he weighed 158 pounds, having gained eight pounds in the course of the experiments. A careful investigation reveals no history of tuberculosis, syphilis or traumatism including corrosion, and since cardio-spasmus can be ruled out, reasoning by exclusion the case is probably one of cancer of the œsophagus.

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* We are indebted to Dr. A. L. Benedict of this city for the above history of the case.

From the above history it will be seen that, as the nature of the obstruction of the œsophagus is not known, it can not be said positively whether a tumor is present or not. A series of nitrogen and chlorine equilibrium experiments were carried out in conjunction with work on the nutrition of patient and the results over an extended period are included, so that they may be compared with those obtained on the cases known positively to be cancer, Nos. II, III, IV, V and VI, with the normal individual case (I) and the case of cardio-spasmus (VII). By the addition of plantose (a pure vegetable albumen) to milk, in varying proportions, it was found possible to convey sufficient food to the stomach of the patient to bring about a gain of 6 kilo in weight in the course of three months. The first series of experiments was conducted with a view to determine the amount of plantose which could most suitably be added to milk and eggnogs in order to give the requisite amount of proteid to maintain the nitrogen equilibrium between the food and excreta. For this period patient's diet consisted of an eggnog once daily, and 250 c.c. of milk with the addition of 20 grams of plantose and 3 grams of salt, three times daily, with milk in addition according to the desire of the patient.

From Table VII, in which the results of this first period are recorded, it will be seen that the loss of nitrogen, averaging 14.6, is only slightly in excess of the nitrogen of the food, averaging 14.4, quantities fairly in accord with the weight of the patient. During this period the chloride equilibrium was not determined with any accuracy, the results indicating a slight tendency to salt retention.

During the second period the nitrogen of the food was diminished to an average of 10.9 grams daily, with the result that a distinct loss of nitrogen was suffered by the system, averaging 1.7 grams daily. The total nitrogen secreted in the urine and fæces, averaging 12.6 grams, is not, however, indicative of toxic influences leading to abnormal destruction of body proteids, a fact which is further confirmed by a relatively low uric acid nitrogen. During this period the chlorides were maintained at a fairly high level, no very considerable differences being observed, an average of .9 grams sodium chloride being retained in the system daily.

TABLE VII.

Period 1.

Nitrogen of food.	Nitrogen of excreta.
13.0	14.6
13.0	13.1
14.2	15.2
15.5	14.5
15.5	14.4
15.5	16.2

Period 2.

Nitrogen of food.	Nitrogen of excreta.	NaCl of food.	NaCl of excreta.
11.4	13.3	12.3	11.2
10.7	12.3	11.7	12.4
10.7	12.3	11.7	9.4

Period 3.

Nitrogen of food.	Nitrogen of excreta.	NaCl of food.	NaCl of excreta.
16.8	14.8	11.7	9.5
16.8	17.6	11.7	11.9
16.9	15.6	11.7	10.9
17.0	13.6		
17.1	14.6		

In the subsequent Period 3 the amount of proteid in the food was materially increased to an average of 16.8 to 16.9 grams daily, with the result that a distinct retention of nitrogen was to be observed. For the first three days of this period the nitrogen intake exceeded the loss by 2.5 grams and for the two following days by as much as 5.9 grams, but it was subsequently found possible to diminish the nitrogen content of the food to 15.5 to 16 grams, at which figure patient gained weight and showed a marked improvement, conditions which are seldom associated with the development of a malignant tumor. For the first three days of this period the chlorides were excreted in a perfectly normal manner, as much as 11.7 grams in the diet being accompanied by a loss of 11.1 in the urine. A determination of the uric acid nitrogen showed a uniform content of .9 to 1.0 per cent of total nitrogen throughout the entire period, a figure which is below that generally obtained by ourselves and other investigators in cases suffering from a malignant tumor. This evidence of the absence of toxic influences would not, however, in itself justify us in deciding against the probability of the presence of a tumor.

At this stage reference must be made to a source of error which has been ignored by practically all those who have devoted attention to work on metabolism. The secretions of the skin, whilst possessed of a very small solid residue in normal healthy individuals, may reach considerable dimensions under pathological conditions which necessitate a performance by the skin of a portion of the kidney function. The meager analytical data bearing on this subject to be found in the literature would indicate a normal loss of .1 to .2 grams nitrogen and .2 to .3 grams sodium chloride per diem, but records are to be found of quantities as large as .5 grams nitrogen and 1 to 1.5 grams sodium chloride having been excreted, under pathological conditions, by the skin. Whilst the sources of experimental error in such work are so enormous as to preclude the possibility of obtaining strictly accurate figures, it is perfectly conceivable that even larger quantities than the above might be removed in the space of 24 hours. In any case it appears probable that the loss of sodium chloride by this means is from two to three times that of nitrogen, and consequently would afford a partial explanation of the fact observed in the majority of our own cases, as well as in those of most previous investigators, that the ratio of sodium chloride to nitrogen is lower in the excreta than in the food consumed. Assuming a minimum loss of .1 grams nitrogen and .2 grams sodium chloride and a maximum of .5 nitrogen and 1 gram sodium chloride, it will be seen at a glance that whilst the huge discrepancies recorded by Moraczewski of 8 or 9 grams difference between the chlorides of the food and those of the urine and fæces would not be materially affected, such a quantity would go far to supply the deficiency of chlorides in the urine observed in certain of our cases.

This source of error may well be advanced as an explanation of the slight discrepancies frequently observed in the balances of body weight, nitrogen and chlorine intake and output, and the osmotic tension of sodium chloride retained in the system, which should involve a retention of water and consequently an increase of body weight. For example, in Case II the observed loss of 77.5 grams nitrogen and a retention of 25 grams chlorine, or 41 grams sodium chloride in a period of eight weeks, would be changed to a loss of 80.7 grams nitrogen and a retention of only 18.7 grams sodium chloride, assuming that a daily loss of .2 grams nitrogen and .4 grams sodium chloride had been suffered by the system through the skin secretions. These figures would correspond far more closely with the variations in weight of the patient, which show from first to last a gain of about half a kilo, presumably attributable to œdema. Such an explanation would remove any necessity for assuming an extraordinarily increased concentration of sodium chloride or diminished dissociation of that substance into ions in the body fluids and cells, the only other conceivable explanation of the discrepancies observed. In other cases in which the daily retention of sodium chloride averages from .5 to 1 gram it will be seen that the loss of this substance by the skin may produce an appreciable difference; it must, however, be said that in those cases in which the salt consumption is small any great loss by way of the skin is improbable.

The blood.—In view of the evidence afforded by some of the above cases that in the last stages of cancer a heavy loss of nitrogen resulting from the destruction of body tissue may be counterbalanced in its effect upon the body weight by a retention of chlorides leading to the formation of œdema, it seemed a matter of considerable importance to carry out analyses on the blood and body fluids of such cases to observe deviations from the normal. Whenever sufficiently large quantities of blood were procurable, estimations were made of the nitrogen, chlorine, phosphorus, the lowering of the freezing point and titrations to the end points of a series of indicators. Blood counts were carried out from time to time, but only as required for clinical purposes, since the very thorough work of Kronkiewicz on this subject, showing variations in reds from 1,800,000 to 6,000,000 and whites from 4,000 to 20,000, rendered further work in this direction superfluous. It is very much to be regretted that, owing to the risk of endangering the life of the patient, we were able to obtain blood in sufficient quantities in only one or two cases in which patient exhibited marked cachectic symptoms, and consequently it was seldom possible to perform all the analyses referred to above in addition to the tests for hæmolysins, etc., referred to previously in this report. We have, however, a series of analyses on cases in which tumors had reached considerable proportions and discrepancies in the nitrogen and chlorine equilibrium had already been remarked, and the results can scarcely be said to deviate from the normal to the extent that one would be led to expect from the literature. The nitrogen, chlorine and phosphorus results varied considerably, showing a slight tendency to diminished nitrogen and increased chlorine (see Table VIII), but scarcely to the same extent as did those of Moraczewski. Titrations carried out on the serum after separation from the clot showed with one exception results very little below the normal in alkalinity. N/50 acid was employed, and from the tabulated results in which the amount of acid required to neutralize 1 c.c. of serum to given end points are recorded, a comparison may be drawn between our cases and those of Rigler. This investigator observed a fall in the alkalinity, both of the blood as a whole and of the serum, in a series of diseases, reaching an acute stage shortly before death, and in case of recovery once more rising to the normal. Using lakmoid as an indicator, he found 1.8 to 2.2 c.c. n/50 acid was required to titrate 1 c.c. of normal blood serum, whilst in acute diseased conditions this figure sometimes fell as low as 1.2 and even 1.1. Our records, whilst slightly below the normal, never reached these figures. (See Table IX.)

Engelmann, in a paper on the freezing point of the blood of cancer patients, finds variations from .56, the normal, to .65 in inoperable carcinoma ventriculi. *We have at present examined only six cases, five of which lie within the normal limits from .56 to .60, one being slightly over the latter figure. We are not therefore able to bring forward any results in support of the generally accepted view that the osmotic pressure of the blood serum of advanced cancer cases is necessarily above the normal, but are rather inclined to consider such variations as attributable to deficient heart and kidney function. It is, however, our intention to deal with the question of blood analysis more thoroughly at a later date, making use of a series of cancer animals. Since, however, gross analyses are of little value in dealing with the disturbances in osmotic equilibrium of cancer-cells, owing to the

TABLE VIII.

Analyses of Blood of Cancer Cases.

	Nitrogen.	Sodium chloride.	Phosphorus.
Cancer of the breast.........	2.13	.48	.03
Cancer of the stomach.......	1.84	.47	.08
Cancer of the liver..........	2.24	.45	.035
Cancer of the stomach.......	2.30	.49	.04

TABLE IX.

Blood Serum (Cancer Cases).

	Phenolphthalein.	Rosolic acid.	Lacmoid paper.
Cancer of liver..............	—.2	.7	1.71
Cancer of liver and stomach.	—.4	.8	1.8
Cancer of stomach	....	.58	1.66
Cancer of intestines	....	....	2.2

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*Analyses on materials obtained at autopsies (see p. 86) are, of course, excluded from these results.

great delicacy of such variations, we are devoting attention rather to the osmotic equilibrium of the individual cell and to the interchange of salt ions capable of passing through the cell walls in the hope of thereby throwing some light on the questions as to whether or no specific toxic influences exerted on the protoplasm of the cells are bringing about changes in their viscosity and permeability.

Whilst it is out of the question to summarize in any satisfactory manner the numerous isolated details brought out in studies in metabolism, and the average of a large number of results gives no idea whatever of the course actually taken in the establishment of any state of equilibrium, we have included a table showing the averages of the nitrogen and chlorides of the food and excreta for considerable periods of time in a series of cancer cases compared with the normal. Such a table is necessarily influenced to a certain extent by experiments carried out (in the course of the period, an average of which is presented) with a view to observing the effect of nitrogen or chlorine starvation or the administering of an excess of either of these substances. It will, however, enable us to recognize any extensive loss or gain of nitrogen or chlorine suffered by the system as the disease develops.

Case I, a normal individual, was submitted to partial proteid starvation and at the same time received widely varying quantities of sodium chloride. As might be expected a slight nitrogen loss was suffered by the body, whilst a marked tendency to the establishment of chloride equilibrium was exhibited.

In Cases II and IV, both carcinoma, in which cachexia had intervened, and the patients were suffering from partial proteid starvation and succumbed to the disease at the completion of the experiments, as well as in other cases records of which are incomplete, a marked loss of nitrogen and retention of chlorides was to be observed. At the same time it must be noted that the excretion of 6.7 grams nitrogen daily is very little above that of the normal individual in a state of starvation, and it does not indicate that the toxic effects of the tumor have led to an excessive proteid decomposition in the body.

Case III is remarkable when it is remembered that the patient's stomach and liver were riddled with carcinoma, and yet so slight an interference exerted upon the nutrition that a retention of nitrogen as well as sodium chloride in the course of our experiments was observed. One source of error unfortunately neglected was the loss of nitrogen and chlorine, which took place from the mouth and throat on expectorating after coughing and the employment of a gargle. It was our intention to repeat the experiments in question, but unfortunately the rapid decline in the state of the patient, followed very shortly by death, excluded the possibility of further investigation in this case.

Case V shows how little effect a rapidly growing sarcoma may exert upon the nutrition, and the nitrogen and chlorine equilibrium of a patient, a practical balance of these bodies being obtained for a space of twelve days.

Case VI, a markedly emaciated and cachectic case of epithelioma of the uterus, showed in the course of our experiments a loss of nitrogen and a retention of chlorides. The differences observed were very slight, a fact which may possibly be attributed to experimental errors resulting from the difficulty of controlling a patient of this type.

In Case VII (cardio-spasmus) as the result of an operation and subsequent infection, the loss of nitrogen in the first period is very considerable, whilst a fair equilibrium of chlorides is maintained. In the subsequent period, patient having recovered from the infection, the nitrogen balance is about normal.

In the last case recorded in the tables, suffering from stricture of the œsophagus, the cause of which is unknown, whilst a nitrogen equilibrium is established on a daily consumption of proteid containing 14 grams nitrogen, a smaller quantity in the diet leads to a loss on the part of the body and an increased quantity to retention of nitrogen. There is possibly a slight tendency to retain chlorides in this case.

We have in Table XI included some of the cases investigated by Müller and Braunstein, from which it will be seen that whilst Müller records a daily loss of nitrogen exceeding 5 or 6 grams in six cases out of eight, Braunstein, whilst obtaining a fair equilibrium in the majority of cases, records one in which as much as 10 grams nitrogen was lost daily through the urine and fæces in excess of that present in the diet. The nitrogen results obtained by the latter investigator correspond fairly well with those which we have obtained; but whilst we have noted a distinct retention of sodium chloride in all cachectic carcinoma cases, he finds a loss in four cases out of five.

TABLE X.

CASE.		Nitrogen of food.	Nitrogen of excreta.	Sodium chloride of food.	Sodium chloride of excreta.
I Normal....................	a	13.0	13.4	11.4	11.9
	b	11.6	13.2	13.1	13.5
II Carcinoma of stomach and pancreas................	a	6.5	6.5	1.85	1.8
	b	5.5	6.7	1.6	.9
	c	4.3	6.7	1.9	.45
III Carcinoma of œsophagus involving stomach and liver....................		9.4	8.5	5.4	4.45
IV Carcinoma of kidney.........		4.5	6.8	2.1	.4
V Sarcoma of skin and connective tissue...........		11.5	11.1	7.8	8.1
VI Epithelioma of uterus, etc....		8.1	9.0	6.0	5.7
VII Cardio-spasmus	a	12.3	17.1	5.4	5.6
	b	13.7	13.5		
VIII Œsophageal stricture (cause to be determined. See page 97)...........	a	14.4	14.7		
	b	10.7	12.6	11.9	11.0
	c	16.9	15.2	11.7	10.8

TABLE XI.

CASE.	Nitrogen of food.	Nitrogen of excreta.	Sodium chloride of food.	Sodium chloride of excreta.	
V Carcinoma ventriculi ..	3.9	11.4	......	......	Müller
VI Carcinoma ventriculi ..	3.45	12.0	.....	......	"
VII Carcinoma ventriculi ..	2.45	9.1	......	......	"
VIII Carcinoma pancreatis..	1.7	6.0	......	......	"
IX Carcinoma mammæ ...	9.1	10.4	......	......	"
I Carcinoma œsophagi ..	7.7	6.5	5.1	5.6	Braunstein
VI Carcinoma œsophagi ..	7.7	7.8	7.0	7.8	"
VIII Carcinoma œsophagi...	7.2	10.3	4.4	3.7	"
IX Carcinoma ventriculi ..	8.8	10.6	7.3	8.5	"
X Carcinoma œsophagi ..	4.2	14.9	.690	.794	"

Moraczewski's results are exactly the reverse of those obtained by Müller and Braunstein. In one case of carcinoma of the uterus he records a retention of 43 grams chlorine and 52 grams nitrogen, the patient merely gaining one kilo in weight. In a case of carcinoma of the ventricle he observed a chlorine retention of 82 grams with a slightly larger variation in weight. In Case VI, carcinoma of the ventricle, with one kilo increase in weight in the course of eight days, a retention of 75 grams nitrogen and 45 grams chlorine was observed. Such proportions are obviously impossible. An increase of merely one kilo in body weight could not conceivably be associated with a retention of quantities of chlorides and nitrogen as large as those recorded in the first and last examples. One must, however, conclude from his publications that he considers his cases afford evidence of a strong chlorine and nitrogen retention, whilst Müller is convinced that the loss of nitrogen is in the majority of cases extremely heavy. Braunstein finds in one case only out of ten any considerable loss of nitrogen, in the remaining cases a slight loss in body weight was observed. Our results differ considerably from either those of Müller or Moraczewski and are more in accord with those of Braunstein. We are inclined to believe that in all cachectic carcinoma cases a loss of nitrogen and a gain of chlorine may be looked for, especially where there is any tendency to œdema, but we have not in our experience met with any such huge differences in the intake and output either of nitrogen or chlorine as are to be found in the tables of either of the three investigators referred to above.

It must be confessed that none of our own cases affords an absolutely satisfactory balance of the various factors referred to in the introduction, change of body weight, loss and gain of nitrogen and chlorine, increase in weight of tumor, loss of tissues and production of œdema. It may, however, safely be said that when allowance has been made for a possible slight loss of nitrogen and chlorine by way of the skin and mouth, and for the other sources of experimental error, all of which tend in the same direction, viz: to an apparent diminution of the nitrogen and chlorine secretions, a fair balance is to be struck in all cases in the metabolic equilibrium. Whilst there is still a margin of chloride retention which would lead one to suppose that the excess chlorine held in the body can not be accounted for exclusively on the basis of increased fluid content, still the differences are not nearly as large as in Moraczewski's cases, and a slightly increased concentration of sodium chloride in the tissues associated with a decreased dissociation of that substance so as not unduly to disturb the osmotic equilibrium, might afford the necessary explanation. Unfortunately for this theory, we have not been able to obtain chemical evidence of any marked changes in this direction in the blood and tissues; but it must be remembered that existing methods of handling such a problem are of necessity crude and the changes to be investigated extremely delicate.

As regards the effect of increasing the quantity of chlorides in the diet and the effect produced by this means on the œdema of the patient, it must be said that whilst normal individuals show a tendency to establish a chloride equilibrium with very great readiness in the space of from 24 to 48 hours, being capable of consuming large quantities of chlorides above the normal without any marked changes in the blood and tissue, cachectic cancer cases, especially those in which the kidneys are deficient in their activity, are incapable of reacting even to a small increase in the amount of salt, marked œdema resulting from any such increase, which only disappears on once more reducing the amount present in the food. For details regarding the effect on the body weight and the secretion of metabolic products brought about by variations in the amount of chlorides in the diet, reference must be made to the analytical results recorded under each case.

The great significance of the role played by soluble chlorides in the processes of oxidation and elimination of waste products can not be overlooked, and we are not inclined to agree with Braunstein in assuming that the increase or decrease in the secretion of salt is simply a question of the amount of water retained in the system with which a certain amount of salt would normally be associated. We are inclined rather to look upon the water as being retained in conjunction with the salt, which in its turn is possibly prevented from proper diffusion by reduction in the permeability of membranes and by its possible association with products of metabolism. For the relative proportions of ammonia, uric acid and other nitrogenous constituents of the urine, phosphates, etc., reference must be made to the individual cases, or to a subsequent article in this report, in which this question is dealt with more in detail. Whilst increased secretions of uric acid and ammonia in proportion to the total nitrogen are frequently observed and assumed to indicate respectively disintegration of tissue rich in nuclein and faulty oxidation, it must be borne in mind that variations in the nature of the food consumed can bring about very marked changes in the proportions of these substances, as may be seen in Cases VII and VIII.

In conclusion it must be said that whilst work of this nature affords considerable evidence of the presence in the system of toxic bodies capable of seriously interfering with the nutrition of the patient, there is no positive evidence that we have to deal in cancer with toxins of a specific type, such as are invariably associated with the course of development of diseases caused by bacteria and other recognized parasites. The presence of nitrogenous suboxidation products resulting from some interference with the metabolism of the cells may well exert an accumulative effect, and as the disease progresses cause all the symptoms with which we are familiar in cancer cachexia.

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CHEMICAL EXAMINATION OF THE URINE AS A MEANS OF DIAGNOSING THE POSITION OF A TUMOR AND OBSERVING THE COURSE OF ITS DEVELOPMENT.

By G. H. A. Clowes, Ph. D.

A paper dealing with this subject and summarizing the results obtained by previous investigators was published by Blumenthal in the report of the Krebsforschung Komité, 1902. The conclusions arrived at by this author possess a considerable amount of value, especially in view of the difficulties that are associated with a thorough investigation of the urine. As the result of analyses carried out on a series of cancer cases we are in a position to confirm for the most part the results recorded in his paper, but in certain cases variations worthy of note have been observed. For the literature reference must be made to the original article. In a previous portion of this report the question of retention of chlorides in the system has been completely dealt with, and it is therefore only necessary to repeat the statement that in cases of advanced carcinoma, where accurate analyses have been carried out on the diet and urine, a considerable loss of nitrogen and retention of chlorides has been observed. It has been suggested by Schöpp that the chlorine apparently retained in the system is really removed from the surface of ulcerating tumors. This explanation was not, however, applicable in any of the cases under observation, with the exception of Mrs. H., in which it received due consideration. That the total chlorides in the urine are so considerably diminished as to be present in proportions as low as one per cent to one-half per cent of the total nitrogen, or even to entirely disappear, whilst the proportion of chlorine to nitrogen in the food is still as 1 to 3, is a matter of daily observation, but it must be borne in mind that the extremely low secretion of chlorides observed by early investigators might frequently be attributed to the diminished proportions of chlorides contained in a milk or fluid diet as compared with a solid diet. In the cases which have been under observation in this Laboratory, so long as the chlorides in the diet were maintained at a normal level of not less than 3 or 4 grams chlorine per diem, and so long as the individual was capable of assimilating solid food, the proportions of chlorine excreted in comparison with that of nitrogen seldom fell below 50 per cent, and it was only when the fatal termination of the disease was approaching that such figures as 2 per cent, 1 per cent and even less were recorded. In fact, the results correspond fairly closely with those observed by Müller, etc., on starving individuals. The explanation offered by this author that the organ proteids which are relatively poor in chlorides were undergoing decomposition in place of the circulating proteids needs further support before it can be accepted.

In six cases in which exact determinations of phosphoric acid in comparison with nitrogen were carried out for a considerable period the amounts of phosphoric in proportion to nitrogen were found to be 6.8, 6.8, 7.2, 7.5, 7.7 and 7.8 per cent, giving an average of 7.3, which corresponds fairly closely with the highest results, 7.3, obtained by Müller, and is slightly in excess of the normal. As regards various nitrogen compounds, we have already dealt with the question of the total nitrogen excreted in comparison with the amount assimilated, and have found that when due allowance is made for all possible sources of waste the amount lost is usually slight and sometimes considerably in excess of that present in the food. The proportions of the various constituents differ widely. Whilst normal urine may be said to contain from 90 to 95 per cent of its nitrogen as urea, about 1.0 to 1.5 per cent as uric acid, 1.5 to 4 per cent as ammonia and the residue as extractive and amido acid nitrogen, similar proportions have been found to obtain in the very early stages of development of those cases of cancer in which the tumor produced no direct effect upon the metabolism and did not interfere with the nutrition. In all cases in which a marked cachectic condition had set in and where the nutrition of a patient was seriously impaired, either by toxic effects or the mechanical development of the tumor, results such as the following were to be observed: Urea nitrogen from 85 to 90 per cent; ammonia nitrogen from 6 to 12 and even 15 per cent; uric acid nitrogen from 1.8 to 2 and even 3 per cent, as compared with .9, 1.0, to 1.3 in other cases. It can not be too strongly emphasized that such results were only obtained in those cases in which inanition, accompanied by the pathological destruction of proteids, had reached an advanced stage. Also it must be remembered that the nature of the diet has a great effect on the uric acid secretion.

Halpern, in fractionating the nitrogenous constituents of pathological urines, presents four cases of cancer, two of them being carcinoma of the stomach with metastases in the liver, one carcinoma in the region of the porta hepatis and the fourth a carcinoma cardiæ. In the first case, carcinoma of the stomach with metastases in the liver, a low urea accompanied by high purin body nitrogen (including uric acid) high ammonia and normal extractive nitrogen were recorded. In the remaining three cases the proportions of the various constituents were not far removed from the normal, the extractive nitrogen being, however, rather high but not in any sense comparable with the high results obtained by Töpfer, Setti and Gumlich for extractive nitrogen, reaching figures from 10 to 23 per cent. We have not in the course of our work met with any such great deviations from the normal as are recorded by these authors, and in one case, carcinoma of the stomach with metastases in the liver, in which no very serious interference with the nutrition was to be observed, practically normal results were recorded for ammonia and uric acid.*

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*Experiments on a series of cases fractionating carefully the nitrogenous constituents of the urine are being carried out in the Laboratory at the present time and will be reported upon when completed.

We have been unsuccessful in an attempt to confirm the observation of Griffiths, who claims to have isolated a specific alkaloid having the formula $C_8H_5NO_3$ from cancer urine by extracting with ether in urine previously evaporated in vacuo and treated with alkali. Our experiments resulted in the separation of kreatinine, traces of xanthine bases and other normal urinary constituents, but not of any compound which could be looked upon as specifically associated with cancer. The observation made by Bouchard that the urine of cachectic cancer patients is more toxic than the normal was confirmed, but this may well be attributed to the larger proportion of normal sub-oxidation products; and, as stated above, the search for any specific ptomaine has been unsuccessful. A large proportion of cancer cases appear to succumb rather to starvation than to any toxic effects exerted directly by the tumor in its development. Any interference with the metabolism of the patient naturally leads to the production of toxic products which induce cachectic symptoms, and, as Müller observed, the noticeable difference between the loss of nitrogen suffered by the normal starving individual and one dying of starvation as the result of interference of a tumor is a slightly more rapid destruction of body proteid and elimination of nitrogen in excess of food consumed per kilo of body weight in the latter case over the former.

The secretion of phenol and indican in the urine in cases of stomach and intestinal cancer frequently reaches from two to four times the normal, but we have seen one case in which a stomach carcinoma failed to lead to the production of any increase in the urine indican. In two cases in which the pancreas was involved we failed to observe any indications of sugar secretion, and are not therefore prepared to consider the absence of sugar in the urine as sufficient proof that the pancreas is not involved.*

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*Since the completion of this paper a publication has appeared by Cammidge on the presence of oxidation products of glycerine in the urine and the diagnosis of pancreatic disturbances and of cancer of the pancreas. We are at the present time testing all cases for this reaction, but have not a sufficient amount of material to justify any expression of opinion regarding the value of this reaction for diagnostic purposes.

Destruction of the tissues rich in nuclein, the kidneys, liver, spleen, pancreas, etc., usually leads as might be expected to a slight increase in the proportion of uric acid and phosphates as compared with nitrogen, seldom amounting, however, to an addition of more than .5 per cent to the uric acid nitrogen and .5 to 1 per cent to the phosphates, as compared to the total nitrogen of the urine. Albumin occurs as would be expected in all cases in which the kidneys are involved, and frequently in cases in which the tumor is breaking down, but we have not been able to confirm the observation of von Noorden that it is present in appreciable quantities in over 70 per cent of all cancer cases.

Lactic acid is found occasionally in the urine in cases in which the liver or uterus is involved. We found it continually in one case of cancer of the uterus, but on the other hand it must be stated that in two cases where large metastases were found in the liver at the autopsy no lactic acid had been separated from the urine at any stage of the investigations carried on whilst the patients were under our observation. We have observed the presence of beta-oxybutyric acid and aceton in the urine of patients in a comatose condition, just as is the case in diabetes, and it is interesting to note that in one case at least this phenomenon was associated with a considerable diminution in the apparent alkalinity of the blood. Ehrlich's diazo reaction is, according to Blumenthal, invariably associated with ulcerating tumors. We have obtained a diazo reaction in a very marked degree in two or three cases in which ulceration had set in, but not invariably.

Whilst it would be out of the question to attempt to establish any hard and fast rules whereby a diagnosis could be effected by a study of the urine, considering the limited state of our knowledge at the present moment, a careful consideration of the various factors suggested by Blumenthal and for the most part confirmed by ourselves, has made it possible on one or two occasions to determine the exact location of the tumor. It is, however, well to bear in mind that we have very little evidence of direct activity on the part of the tumor cells leading to any specific effect upon the nature and proportion of the products excreted in the urine, the changes observed being for the most part those which would be induced by some interference with nutrition and the normal processes of oxidation, and also such as would be induced by secondary bacterial infections. A very extensive series of experiments carried out with a variety of group color reagents and also a series of biological tests for specific products which might be definitely associated with tumor cells have so far been resultless in so far as the urine is concerned, but there appears to be no reason why a continuation of work in this direction might not lead to some means of effecting an early diagnosis of cancer.

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ON THE SECRETION OF THE STOMACH IN CANCER AS COMPARED WITH THE NORMAL.

By G. H. A. Clowes, Ph.D. and E. W. Jeffcott, Ph.B.

As a part of the routine work of this Laboratory in the course of the last two years upwards of 200 stomach contents have been submitted to a detailed chemical analysis. Whilst our primary object has been the early recognition of gastric cancer, the materials at our disposal, including as they do some 30 pathologically diagnosed cancer cases, may be utilized to throw some light on the problems of impaired nutrition and disturbed chemical equilibrium associated with this disease.

In a previous paper, an abstract of which has been included at the end of this report, the application of volumetric methods to the analysis of peptic digests has been discussed in detail (see p. 161). The use of various indicators for the direct estimation of acids and akalies will not therefore be further referred to in this paper, except in so far as the normal deviates from the pathological, and also to make comparisons between the rapid volumetric methods usually employed in clinical laboratories, and the accurate but more tedious gravimetric methods which are only available in a well-equipped chemical laboratory.

An attempt has been made to select the most accurate analytical methods and by their application to a series of normal and pathological cases to throw light on the following problems:

1. With given test meals to determine the relationship, if any, existing between the amount of hydrochloric acid secreted and the total of nitrogenous products brought into solution through the action of pepsin on readily precipitated proteids.

2. On the fractionation of the above products of proteid hydrolysis by means of a series of precipitants and the relationship, if any,

existing between such fractions and the titration results. Also the investigation of the value of the phosphotungstic and tryptophan tests for diagnosis of cancer.

3. Regarding the direct secretion of sodium chloride, phosphates, etc., as well as hydrochloric acid, and the possible conversion of hydrochloric acid into sodium chloride through interaction with the sodium salts of organic acids.

4. On the osmotic pressure of the stomach contents at various stages of digestion; the possible role played by physico-chemical phenomena in the mechanism of secretion, and the extent to which toxins or other poisons acting on the cell protoplasm could interfere with the normal state of chemical equilibrium, resulting in an entire or partial suspension of the acid secreting function, or the reverse.

Analytical methods employed.—It seems advisable at this stage to give a brief outline of the analytical methods we have employed so that no confusion may arise:

Volumetric titrations whenever possible on unfiltered as well as filtered contents (see p. 122) were made as follows:

Phloroglucinvanillin drops to faint pink end point on hot porcelain plate.

Alizarin to first color change, to faint red; occasionally when two figures are given, to purple.

Phenolphthalein to first pale pink.

Dimethyl-amido-azo-benzol, lakmoid and Porrier's blue were also employed occasionally.

For details reference must be made to abstract. (See p. 161.)

Estimation of phosphates.—The method at present employed in estimating acid phosphates was also found to be extremely faulty. In order to obtain an estimate of the actual amount of phosphates present and of the effect which they produce upon the titration, use was made of the two following points: (1) that the salt NaH_2PO_4 is converted into Na_2HPO_4 between the alizarin and phenolphthalein end point; and (2) that the salt Na_2HPO_4 may be converted into Na_3PO_4 or its equivalent $Ba_3(PO_4)_2$ between the phenolphthalein end point when that indicator is used alone and in the presence of barium chloride and excess alkali. And since it was shown that two of the three hydrogen atoms of the phosphoric acid are neutralized previous to the phenolphthalein end point in titration and one atom previous to the alizarin end point, allowance may be made for the phosphates by deducting the mean of the result obtained above from the alizarin end point and twice that quantity from the phenolphthalein end point.

The working method employed in all cases to which reference is made in this article is as follows: Filtered stomach contents (25 c.c. if possible) evaporated with a few drops of weak alkali, ashed, extracted with weak acid, filtered, boiled to drive off CO_2, made alkaline and boiled with pure n/10 NaOH to drive off ammonia, made up to definite volume and titrated from phenolphthalein to alizarin and from phenolphthalein to the same indicator after boiling with an excess of alkali in the presence of barium chloride.*

It is needless to say that the assumption of Töpfer that the period of titration from dimethyl-amido-azo-benzol to alizarin is attributable principally to acid phosphates, is incorrect.†

Estimation of chlorides.—In order to obtain accurate data regarding the excretion of hydrochloric acid and chlorides, it was found necessary to evaporate and incinerate the filtered and unfiltered stomach contents in all cases; and also for comparison's sake, to follow the same proceeding with a test meal, the duplicate of that which had been given to the patient. The following estimations were made in all cases in which there was sufficient material at our disposal; a slight modification of the methods of Martius and Lüttke being employed:

a. Chlorine present in the form of neutral inorganic salts other than ammonia by evaporating 10 c.c. of stomach contents and ashing without the addition of alkali, extracting with boiling water and estimating the chlorine, either gravimetrically, as silver chloride in a previously weighed Gooch crucible packed with asbestos, washing with nitric acid, water, alcohol and ether respectively and drying at 100° ; or, volumetrically, by adding to the aqueous extract of ash an excess of n/10 solution of silver nitrate and titrating the unused silver by means of a standard solution of potassium sulpho cyanid, using ferric sulphate as indicator.

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*Am. J. of Pharmacy, vol. 75, Feby. 1903.

†It must be said that the presence of any considerable quantities of phosphates in a test meal is likely to materially affect the titrations, analyses, etc., and is therefore to be avoided whenever possible.

b. The estimation of total chlorine present in the form of inorganic salts of the alkalies, as ammonium chloride and as free or combined hydrochloric acid by addition of excess of dilute sodium hydrate, evaporation, ignition in a platinum crucible as in *a*, subsequent estimation of the chlorine as described above. An alternative gravimetric method which yielded almost identical results consisted in treating a definite quantity of the filtered stomach contents with fuming nitric acid in the presence of an excess of silver nitrate for some days until organic matter was destroyed, diluting with water and filtering through a Gooch crucible as described above. This method gives results almost equal to those obtained in a Carius tube and slightly higher than those obtained by the method previously described, possibly due to the fact that the evaporation and ignition of a carbonaceous residue in an open platinum vessel always leads to a slight loss of chlorides, even though the greatest precautions may be taken not to carry the process of ashing too far. Or a slight difference may be attributable to the inclusion of a very small quantity of organically combined chlorine which would be lost in all probability in the first process but absorbed by the silver nitrate in the second. In any case the loss is so slight that it may be ignored in the physiological chemical work in which the experimental error is necessarily higher than in that of a purely chemical nature.

c. In order to obtain an estimate of the influence attributable to ammonium, a body which seldom occurs in fresh stomach contents in any considerable quantity, an additional portion of 10 c.c. of the original stomach contents was neutralized exactly with n/10 alkali to the phenolphthalein end point, evaporated, ashed and treated as above.

It will thus be seen that by the above process of ashing stomach contents, extracting chlorides and estimating them either volumetrically or gravimetrically, we have obtained from *a*, chlorine present as inorganic salts (not including ammonia); from *c*, chlorine present as inorganic salts + chlorine present as hydrochloric acid free and combined; from *b*, chlorine present as inorganic salts, as hydrochloric acid free and combined and in the form of ammonium chloride. By subtracting *a* from *c* we have the total hydrochloric free and combined with proteids. By adding *a* to *b*—*c* we have the total chlorine present in the form of salts of the strong alkalies and ammonia.

d. An effort was also made to estimate the chlorine present as free hydrochloric acid by treating with barium carbonate, filtering and washing the residue and estimating the amount of barium which had passed into solution, the equivalent being assumed to be a measure of the actual free hydrochloric acid. Some of the results obtained by this method have been recorded but it is inaccurate, and since for reasons which will be referred to later it appears probable that the passage from absolutely free to entirely combined hydrochloric acid is not sharp but gradual and is a question entirely dependent upon the equilibrium of the chemical system concerned, we have not thought it worth while to continue this series of experiments.

Nitrogen.—Nitrogen was estimated in all cases in the filtered stomach contents, the same solution being employed as in the experiments enumerated above.

a. Duplicate quantities of 5 or 10 c.c. were employed for the estimation of total nitrogen by the Kjeldahl process, potassium sulphate being used to raise the temperature.

b. Ten c.c. rendered slightly acid to phloroglucinvanillin drops, if not already so, boiled and filtered and nitrogen estimated in filtrate.

c. Ten c.c. saturated with excess of zinc sulphate crystals, filtered and nitrogen estimated in filtrate.

d. Ten c.c. precipitated with tannin tartaric acid solution, recommended by Effront, filtered and nitrogen estimated in filtrate.

e. Ten to 20 c.c. of the filtered stomach contents were warmed, treated with an equal quantity of hot but not boiling solution containing 20 per cent phosphotungstic acid and 2 per cent sulphuric acid, shaken, allowed to settle and filtered, precipitate being washed with a 10 per cent phosphotungstic acid, nitrogen determined directly in the filtrate by means of the Kjeldahl method.

Estimation of lactic acid.—A qualitative test for lactic acid was first performed by evaporating 10 c.c. of the stomach contents with a small quantity of hydrochloric acid to half its bulk. The solution was then extracted in a separating funnel with 10 c.c. of pure ether. The etherial extract after separating was allowed to flow on to the top of a 1 per cent aqueous phenol solution to which a drop of ferric chloride had been added. At the points of contact of the two fluids a yellow rim was formed in the presence of lactic acid, affording a strong contrast to the purple of the neighboring liquid. A complete transformation into yellow would follow on shaking the mixture provided any appreciable quantities of lactic acid had originally been present. In case the presence of lactic acid was established by this preliminary test, the exact quantity was estimated directly by means of the usual iodine and thio method.

Filtration of stomach contents.—The question as to whether the best results may be obtained with or without filtration of stomach contents is one which is frequently raised in the literature. When an Ewald test meal is employed with a sufficient quantity of water (250 c.c.) no very considerable difference is made in the titration and chloride results, and since it is impossible to estimate the nitrogenous constituents without filtration, it seems advisable to use filtered rather than the original stomach contents, especially in view of the fact that in the clear solution the end points of indicators are rather sharper. On the other hand, we have frequently encountered cases in which for some reason or other an Ewald breakfast was unsatisfactory, as, for example, when a gastrostomy had been performed and the patient was fed through a tube. When a soup meal consisting principally of vegetable proteids is employed, a very material difference is to be observed between the filtered and unfiltered stomach contents. Whilst the osmotic pressure as estimated by the freezing point remains practically constant, not varying by more than .02° C. before and after filtration and the total quantity of chlorine present in the form of acid + salts, estimated by gravimetric methods, is also fairly constant, the titration results show a great difference as do the figures indicating the proportion of salts to hydrochloric acid. In other words, as will be seen by an inspection of Table XII, a much larger proportion of sodium chloride passes through the filter than remains behind, whilst a large proportion of the hydrochloric acid is retained by the insoluble or partially insoluble proteids left on the filter. In one case, for example, whilst the total chlorine was 7.3 before and 7.5 after filtering, the chlorine present as salts was 2.1 before and 4.0 after filtration, giving differences of 5.2 and 3.5 for the available hydrochloric acid in the solution. These figures correspond with the phenolphthalein end points, which show 7.0 before and 5.1 after filtration, the difference being attributable in both cases to the influence of phosphates and organic acids, the freezing point meanwhile remaining practically constant, only changing from .39° to .40° C. Now, since such differences occur very frequently and reach even larger proportions, it must be borne in mind that filtered stomach contents never actually permit of an estimate of the total hydrochloric acid available for digestive purposes, and that when regular test meals containing large quantities of animal or vegetable proteids are administered, the error introduced by filtration may reach such considerable proportions as to entirely mask the presence of quite appreciable quantities of hydrochloric acid. More especially is this the case if, owing to weak pepsin, the proteids have not been reduced to a point at which they pass fairly readily through the meshes of an ordinary coarse filter paper. In one case the unfiltered stomach contents showed both volumetrically and gravimetrically 2.8 c.c. of hydrochloric acid free and combined with proteids, a quantity which, whilst below the normal; was very considerably in excess of that found in the filtrate, which was only 1 c.c. We have therefore made a practice of determining chlorides, phosphates, titrations, etc., in unfiltered contents,

TABLE XII.

Case		F P	Phenolpht. end point	Total Cl	Salts Cl	HCl by Diff.	Phos-phates
I	Before filtration.	—.39°	7.0	7.3	2.1	5.2	1.6
	After filtration..	—.40°	5.1	7.5	4.0	3.5	1.4
II	Before filtration.	—.38°	7.5	6.9	1.8	5.1	1.5
	After filtration..	—.39°	5.9	7.3	3.0	4.3	1.4

and also in filtered when material permitted. Total nitrogen and its various fractions could only be determined in filtered contents, and consequently all figures used in comparison with nitrogen were estimated in the same solution.

1. *Relationship between hydrochloric acid secretion and peptic activity.*—A series of preliminary experiments with artificial peptic digests using varying quantities of hydrochloric acid has shown us that after allowing for soluble nitrogenous products brought into solution by the acid alone the degree of peptic activity is fairly proportionate to the nitrogen present either in the clear centrifuged solution or in the filtrate from which the insoluble residues have been removed, provided a sufficient dilution is maintained and all the working conditions are constant and the period of activity limited to three or at most four hours. We have therefore felt justified in considering the total nitrogen present in filtered stomach contents (after allowing for the soluble nitrogenous bodies present in the original test meal) as proportional to the peptic activity. The determination of this total nitrogen as against the available free and combined hydrochloric acid in some 200 normal and pathological cases (showing equivalents from 1 : 1 to 10 : 1, the large majority lying between 2 : 1 and 3 : 1) has convinced us of the correctness of the view held by Pawlow that no constant relationship obtains between the peptic activity and the hydrochloric acid secretion. The addition of further quantities of hydrochloric acid to pathological contents which showed an absence of free acid frequently led to a greatly increased peptic activity as estimated by the nitrogen brought into solution; a further proof that peptic activity and hydrochloric secretion do not bear any direct relationship to one another.

A method suggested by Benedict for estimating the degree of peptic activity by precipitating the filtered stomach contents with an excess of phosphotungstic acid and centrifuging has not been found to give satisfactory results on comparison with the nitrogen content of the same filtrates.

2. *Fractionation of products of proteid hydrolysis; phosphotungstic and trytophan tests.*—The digestion of proteids in a normal stomach by means of pepsin hydrochloric was supposed until recently to stop

short at the formation of albumoses and peptones. Boas, Schaeffer, Hammerston, Gamgee, Neumeister, Foster, Beilstein and Hughes fail to make any reference in their works to the formation of bodies representing further hydrolysis of the peptones until the latter substances are submitted to the influence of tryptic digestion. Effront recognizes the presence of proteids not precipitated by phosphotungstic acid. Zunz refers to substances which fail to give the biuret reaction with copper; also in a subsequent paper to nitrogenous bodies giving a biuret reaction which are precipitated by phosphotungstic and not by picric acid. Pfaundler in dealing with the end products of peptic activity concludes that after precipitating albumoses with zinc sulphate and peptones with phosphotungstic acid, a residue of nitrogenous products remains in the filtrate which fails to give the biuret reaction which, on hydrolysis with strong acids, may be split up into amido bases and amido acids, the bases thus formed being readily precipitated by means of phosphotungstic acid.

Lawrow and Langstein established the existence of crystalline end products of peptic digestion. It must, however, be borne in mind that such bodies were only obtained by them in vitro after long periods of incubation.

Reach in a paper on the digestive processes in the stomach, referring to the work of Zunz, who found 90 per cent of the non-coagulable nitrogenous products present in the stomach contents of dogs in the form of albumoses, started an investigation as to whether the limit of further digestion were 10 per cent or whether the residual bodies formed were immediately absorbed owing to their lower molecular weight. He carried on his experiments with dogs, and fractionating the contents after four hours he found from 30 to 56 per cent of albumoses, from 35 to 20 per cent of peptones and from 31 to 32 per cent of end products, according to the quantity of proteid in the original test meal. The albumoses were precipitated by saturating with zinc sulphate and the peptones by the addition of picric acid to the filtrate from the albumoses.

Emerson, working with Müller, investigated the products obtained by fractional precipitation of the stomach contents of normal individuals and arrived at the conclusion that saturation with zinc sulphate gave a precipitate of albumoses containing 51.5 per cent of the total nitrogen; that further precipitation with warm concentrated phosphotungstic acid gave an additional precipitate of peptones containing 31.4 per cent of the total nitrogen, and that the residual filtrate, amounting to about 17 per cent, representing a more advanced stage of proteolysis, was fairly constant. In the stomach contents of a cancer case he found figures differing very considerably from the above, the albumose fraction being 25 per cent, peptone 47 per cent and the phosphotungstic filtrate over 27 per cent. He claimed that not only were such results to be obtained from the actual stomach contents but that the cancer itself must contain an enzyme capable of carrying peptic digestion to a more advanced stage. Equal weights of cancer tissue, one without heating and the other heated to 80° C. were added to two fibrin hydrochloric acid pepsin digestion mixtures, with the result that after several days the albumose precipitate in the heated test was much larger and the phosphotungstic filtrate much smaller than in that which had not been heated. Toluol was made use of to retard the development of bacteria, but toluol is a comparatively weak disinfectant for a long digestion and apparently no filtration experiments through bougies were carried out, and even had this been the case, previous bacterial development in the tumor might have influenced the result.

We have wherever possible made use of Ewald breakfasts or plain proteid test meals in stomachs which had previously been washed out with distilled water. After removing and filtering the contents when the quantity was sufficient (in addition to the titrations and the determinations of chlorides, phosphates, etc., referred to in another section) the nitrogen precipitate by boiling was determined, the nitrogen precipitate on saturation with zinc sulphate, the nitrogenous bodies precipitated with phosphotungstic and those present in the phosphotungstic filtrate. In certain cases the precipitate with bromine and the precipitate by means of tannin-tartaric acid solution were also determined. The precipitate on boiling was usually from 3 to 5 per cent. That obtained by saturating with zinc sulphate under normal conditions from 40 to 55 per cent, a result which was frequently fairly in agreement with that obtained from the tannin-tartaric acid. The phosphotungstic acid precipitate was usually about 80 per cent, leaving the phosphotungstic acid filtrate containing between 17 and 20 per cent of the total nitrogen.

In the accompanying Table XIII the results of fractionating normal stomach contents according to the above scheme are recorded. Three cases are typical of many others and will suffice as an illustration of normal results. Column 1 gives in cubic centimeters of a $\frac{1}{10}$ N solution the total nitrogen in 100 c.c. of stomach contents. Column 2 the nitrogen content of the bodies which have been precipitated by boiling. Column 3 the nitrogen of the zinc sulphate precipitate obtained by saturating the solution with that salt and subsequently washing the precipitate with a saturated solution. Column 4 gives the nitrogen of the phosphotungstic acid precipitate obtained by treating 10 c.c. of the warm stomach contents with 10 c.c. of the 20 per cent phosphotungstic acid solution (containing 2 per cent of sulphuric acid) referred to above. Column 5 gives the results of a similar precipitation with phosphomolybdic acid and 6 the nitrogen content separately determined of the filtrate from the phosphotungstic acid precipitate. It will be seen that in the first two cases the portion precipitated by boiling is about 3½ per cent; by saturating with zinc sulphate over 50 per cent; by precipitating with phosphotungstic or phosphomolybdic acid over 80 per cent, the resulting filtrate being about 19 per cent. In the third case, whilst the precipitate on boiling with phosphotungstic acid was about the same as in the first case, the zinc sulphate filtrate was considerably smaller, being about 37 per cent. The titrations of the same materials in Case I showed for 10 c.c. 3.5 c.c. to phloroglucinvanillin drops end point;

TABLE XIII.

Normal case	1	2	3	4	5	6
I.........	147	5	79	119	120	27
II.........	160	6	85	129	127	30
III.........	144	5	53	117	118	26

4.4 c.c. to the alizarin end point and 7.1 c.c. to the phenolphthalein end point, the difference of 2.7 between the two latter corresponding very closely with the phosphotungstic filtrate, a point which will be referred to at a later stage. The end point 7.1 c.c. for phenolphthalein after deducting .6 c.c. attributable to phosphates corresponds fairly with 6.3 c.c. of available hydrochloric acid estimated gravimetrically. The hydrochloric acid present is consequently equivalent to rather less than a half of the total nitrogen, a relationship which very frequently obtains.

In Table XIV a series of the most widely deviating pathological cases has been selected and will suffice to prove that not only is the above relationship of normal cases by no means constant, but also that certain pathological cases do not necessarily deviate from the

TABLE XIV.

	1	2	3	4	5	6	7	8
Total nitrogen...........	158	185	162	110	150	116	210	91
Nitrogen in zinc sulphate ppt....................	70	86	98	30	45	55	35	10
Nitrogen in phosphotungstic filtrate.............	25	47	17	36	37	53	47	60
Physiologically available hydrochloric acid......	18	23	Nil	12	Nil	66	45	90

normal as might be supposed from the literature. Cases 1 to 5 were microscopically and clinically and subsequently by autopsy diagnosed as cancer of the stomach, and it will be seen at a glance that while three show a high percentage of phosphotungstic acid filtrate the remaining two are perfectly normal, being under 20 per cent. On the other hand, cases 6, 7 and 8, which are not cancerous, 6 and 7 being gastric ulcers and 8 a case of hyperchlorhydria, may be selected as illustrating an extreme deviation from the normal, phosphotungstic filtrates being 46, 24 and 65 per cent respectively. The appended figures showing the amount of hydrochloric acid physiologically available in the stomach are simply introduced to show that abnormalities may occur either in the complete absence or in the presence of an excess of free hydrochloric acid.

After determining the nitrogen of the phosphotungstic filtrate as against the total nitrogen in some 200 stomach contents after proteid or Ewald test meals, we are by no means inclined to agree with Emerson in assuming that a greatly increased phosphotungstic filtrate may be looked upon as indicative of cancer of the stomach. The largest recorded analyses of 60 and 70 per cent referred to above were obtained in cases of hyperacidity. On the other hand, figures in excess of the normal were obtained in certain cases in which hydrochloric was practically absent and the bacterial enzymes had evidently played an active part. Whilst normal stomach contents, generally speaking, show from 18 to 22 per cent after from two to three hours digestion, and cancer cases frequently show as much as 40 per cent, we have had six cases of cancer of the stomach confirmed subsequently by autopsies, which showed from 10 to 20 per cent phosphotungstic filtrate, and 2 cases of gastric ulcer have given results even in excess of the highest obtained in cancer. The same relationship is found to obtain in dealing with Ewald's tryptophan reaction, which will be referred to later.*

Whilst there does not appear to be any constant relationship between the available hydrochloric acid present in a gastric digest and the total quantity of nitrogen in the solution (which may be taken as a criterion of the peptic activity) other definite proportions occur frequently in the various nitrogenous fractions which can scarcely be overlooked. When digestion has been allowed to take its proper course in the presence of a normal proportion of pepsin and hydrochloric acid for at least two to two and a half hours, whilst the total range of titration varies within very wide limits, as was shown in a previous paper referred to above, that portion lying between the alizarin and phenolphthalein end points is, after allowing for phosphates, frequently about 18 to 20 per cent of the total nitrogen equivalent. The phosphotungstic filtrate is also, as stated above, frequently about 20 per cent of the total nitrogen; consequently a very close equivalence exists between the range from alizarin to phenolphthalein on titration and the phosphotungstic filtrate. (See Table XV.)

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*In considering the apparent tendency to advanced proteid decomposition in cancer as compared with the normal resulting in an increased phosphotungstic filtrate, it is interesting to note the result of some experiments carried out in this Laboratory in the winter of 1902, having in view the production of an anti-pepsin by means of rabbit serum. Von Dungern has obtained an anti-pepsin by making use of geese and failed to obtain any reaction from the ordinary laboratory animals. Our results agree entirely with his in the main, the sole difference being the tendency to an increased phosphotungstic filtrate in those cases of peptic digestion to which the immune serum had been added, in comparison with those containing normal rabbit serum. This would indicate either a stimulus of the secondary digestive function of the stomach or a neutralization of some normal constituent, the function of which would be to restrain any tendency to the continuation of peptic digestion beyond a certain point. It is conceivable, although scarcely probable, that such a body controlling the digestive processes and protecting the cells from the action of peptic and other enzymes may be entirely destroyed in certain cancer cases. We are not, however, inclined to the belief that this is actually the case, considering it far more probable that the observed results are due to secondary antolytic or bacterial enzymes.

TABLE XV.

Case	1	2	3	4	5	6	7	8	9	10	Avg.
Alizarin to phenolphthalein	25	19	30	26	43	31	17	31	21	35	.....
Phosphates	4	2	5	4	5	4	1	5	3	5	.....
Difference	21	17	25	22	38	27	16	26	18	30	24.0
Total nitrogen	113	107	131	120	228	135	80	127	104	144	128.9
Phosphotungstic filtrate	23	19	23	27	40	26	18	24	19	27	24.6

In this table are recorded the titration differences between alizarin and phenolphthalein, the phosphates determined independently which should be deducted from the previous quantity in order to form a fair estimate of the influence attributable to some specific basic group combined with hydrochloric in the solution. The total nitrogen and the nitrogen of the phosphotungstic filtrate from 100 c.c. of stomach contents were also recorded in their n/10 equivalents. It will be seen at a glance that the closest relationship exists between the corrected titration and the phosphotungstic filtrate; further, that both these quantities are slightly less than one-fifth of the total nitrogen.

This relationship obtains in about 40 per cent of the pathological cases investigated, but is subject to wide and unaccountable variations which preclude its utilization as a means of diagnosis. It has been stated previously that where hydrochloric acid is deficient, or from some other cause stagnation or bacterial decomposition has occurred, the widest range of variation of titrations is encountered, and at the same time the phosphotungstic filtrate is likely to rise considerably above 20 per cent, its normal value. But the titration fraction from alizarin to phenolphthalein is not necessarily affected at the same time as the phosphotungstic filtrate, very frequently one remaining directly proportionate and the other being greatly increased or diminished, and that without any apparent rule, certain cases of well-marked cancer of the stomach exhibiting normal proportions and others deviation in one direction or the other, more generally, however, in the matter of the phosphotungstic filtrate.

Whilst the residual phosphotungstic filtrate shows a certain relationship with the titration results, it has not been found possible to trace out any connection between the so-called albumose fraction, precipitated by zinc sulphate, and the portion between zinc sulphate and phosphotungstic acid supposed to represent peptones and amido bases and the titration results. The period from drops to alizarin which probably represents some form of weakly combined hydrochloric fails to show, as might be expected, any proportionality with any of the above mentioned fractions of the nitrogenous constituents and can not therefore be made use of as a means of differentiating between the normal and pathological, except in those cases in which an abnormal bacterial disintegration of proteids resulting in the liberation of free acid groups shows titration results out of all comparison with the mineral acids actually present.

The observation made by Winternitz, Malfatti and Glaessner independently that tryptophan, one of the final products of tryptic digestion, is to be found amongst the products of peptic digestion, led to the examination of normal and diseased stomach contents for this substance as a possible means of diagnosing pathological conditions. Since tryptophan has been identified by Hopkins and Cole as an indolamino propionic acid and is generally associated with leucin, tyrosin and similar products of final proteid digestion, and possesses in common with the latter the property of not being precipitated from a weak acid solution by means of phosphotungstic acid, its presence or absence might be expected to correspond with the increase or decrease in the size of the phosphotungstic filtrate. Glaessner tried the effect of feeding patients with proteid test meals, removing the contents and testing with bromine water in the presence of small quantities of acetic acid. He experimented with 36 cases, 12 of which were cancer, and obtained positive results in only 4 cases, all of which were highly acid and only one carcinoma. The same author tested the effect of adding stomach contents of cancer cases to a normal peptic digest, obtaining a positive result in only one case. On the other hand, he found that the addition of the actual tumor material to a normal pepsin-hydrochloric digestion led in the course of 24 hours to a strong tryptophan reaction with bromine, other tissues, normal stomach membrane, liver, etc., giving negative results. Erdmann and Winternitz in discussing the proteinochrom (tryptophan) occurring in the stomach contents, recommend the use of chlorine instead of bromine on account of the disturbing effect of an excess of the latter substance. They failed to obtain the reaction in any normal or pathological cases other than cancer, except where stagnation of the contents had led to secondary decomposition. In carcinoma they obtained a positive reaction by the addition of chlorine water, drop by drop, to filtered stomach contents in the large majority of cases, even in the absence of bacterial decomposition.

In the course of the last twelve months we have tested on suspected cancer cases both with chlorine and bromine in weak acid solution. Whilst stagnant stomach contents, especially in the presence of a large excess of acid, will frequently give a faint reaction, as will stomach contents in which bacteria have suffered no check owing to the absence of free hydrochloric, we have never succeeded in obtaining any marked reaction in cases in which the stomach had been carefully washed with distilled water before administering the test meal.

We have further attempted to follow out the method made use of by Emerson for the phosphotungstic filtrate and Glaessner and subsequently Erdmann and Winternitz in studying the trytophan reaction, of adding cancer of the stomach tissue immediately after the operation to artificial peptic digestion mixtures which were allowed to stand over night in the incubator. Even then the phosphotungstic filtrate was not necessarily greatly increased and the trytophan reaction was only obtained after incubation periods varying from 24 to 48 hours in some 40 per cent of the cancer cases. It was further observed that far the strongest reaction with chlorine was obtained when in the absence of disinfectants foreign organisms were allowed to develop whether the tissue employed were of a cancerous origin or not. We have not up to the present examined a sufficient number of cases to be justified in offering a positive opinion on the subject, but it can not be said that the evidence so far obtained would justify the assumption that the phosphotungstic and tryptophan reactions may be looked upon as indicating the presence in cancerous tissue of some peculiar enzyme capable of carrying proteid digestion to an abnormally advanced stage in the presence of free acids. The fact that the best reactions were invariably obtained in those cases in which advanced bacterial decomposition had already taken place inclines us to the belief that any such reaction is merely secondary and is not to be attributed to the direct influence of the carcinomatous cell and its contents. This is the more unfortunate since the existence of such a body capable of decomposing peptones with the formation of some of the final products of tryptic digestion might well explain the disturbances in equilibrium resulting in the suspension of hydrochloric acid secretion, etc., observed in cancer cases.

SECTION III. *Secretion of Chlorides, Hydrochloric Acid, Etc., in Cancer.*

Reissner in dealing with the estimation of hydrochloric acid in the stomach contents points out errors in practically all existing methods. He finally makes use of a modification of that of Martius and Lüttke. He decides after numerous experiments with free hydrochloric acid in the presence of chlorides, phosphates, peptones, organic acids, etc., to determine the physiological available hydrochloric acid by a method similar to that which we employ, the exception being that he titrated filtered stomach contents to the laknus end point instead of phenolphthalein, and consequently found rather larger proportions of the chlorides present as ammonium salts. The method depends, as does that which we have employed, upon the assumption that in stomach contents, which are evaporated, charred and partially but not completely ashed, a point can be determined empirically at which the chlorides originally present will still be entirely retained and the hydrochloric acid which was present in the free state and combined with proteids or ammonia completely evaporated. Further, that by addition of alkali to a given end point one may include all the acid present in the free state and combined with weak bases present in the proteid molecule, without including that which was present in combination with ammonia; and that an excess of alkali will certainly include all chlorine originally present of whatsoever sort, provided too high temperatures are not employed in ashing. If the temperature is carried too far there can be no question that small quantities of chlorides are lost by direct vaporization; also that acid phosphates interacting with sodium chloride would eventually liberate hydrochloric acid. Reissner apparently attributes the low figures which he obtains partially to insufficient time permitted for the reaction to reach equilibrium after the addition of the exact amount of alkali required to neutralize the hydrochloric acid, or an excess. Also he suggests the possibility of neutral chlorides as calcium chloride interacting with acid potassium phosphate with the liberation of potassium chloride and hydrochloric acid, which is volatile. The actual state of equilibrium eventually established is entirely dependent upon the concentrations and the temperatures employed at various stages of the analysis. The simplest solution of such a problem is to avoid test meals containing any large quantities of phosphates, organic acids, ammonia, etc., and to make exact analyses of such test meals, a procedure which we have systematically adopted.

It has been noted in a previous section of this paper that the secretion of pepsin in the stomach is less readily influenced by the presence of a tumor than is that of free hydrochloric acid. Tests for the presence of free hydrochloric by means of phloroglucinvanillin drops, or of hydrochloric combined with proteids by the gravimetric methods referred to above may show absolutely negative results before the secreting cells have been seriously interfered with by the development of the tumor, a fact which excludes a purely histological explanation of the phenomena of impaired hydrochloric acid secretion. This extreme sensitiveness of the hydrochloric as compared with the pepsin secreting function of the cell is remarkable in view of the fact that mineral salts are chemically far less susceptible to changing conditions than are the enzymes and ferments. On the other hand, salts and mineral acids are electrolytes and consequently play a very important role in the establishment of osmotic equilibrium, and any disturbing influence in this direction may well be expected to affect them more easily than pepsin, a body which is presumably possessed of a large molecule and is incapable of playing any considerable role in osmosis.

Having observed in the course of our gravimetric work on the chlorides of the stomach contents that abnormally large quantities of sodium chloride are frequently found associated with very minute quantities of hydrochloric acid, the first point to be determined was to what extent sodium chloride might be secreted directly in the stomach in the place of free hydrochloric; also to what extent the hydrochloric when secreted might be directly neutralized by contact with the sodium salts of organic acids produced as products of suboxidation in the tumor itself. A long series of experiments was carried out on cancerous and non-cancerous cases as follows: Series of test meals were given containing definite quantities of sodium chloride, the greatest precaution being taken to remove all traces of chlorides from the stomach before commencing the experiments. After the usual period had been allowed to elapse the contents were removed, the residues washed out and the total quantity carefully analyzed. In practically all cases, both normal and abnormal, more sodium chloride was present in the stomach than had actually been introduced with the test meal. In normal cases this proportion seldom exceeded 5 to 10 per cent of the total amount of chlorine present, but in cancerous cases, especially those in which the tumor had already commenced to disintegrate, quantities of sodium chloride far in excess of those actually introduced and sometimes nearly equivalent to the normal proportion of hydrochloric acid were encountered. This was not, however, always the case, a total absence of hydrochloric acid being associated occasionally with an almost total absence of sodium chloride over and above the quantity actually introduced. Any neglect in the removal of the stagnant contents previous to administration of the test meal invariably showed a high proportion of sodium chloride, possibly owing to the increased volume of fluid affording an increased osmotic tension and increased secretion of salts and the presence of the sodium salts of organic acids which would react with any hydrochloric acid secreted. In one case, primary cancer of the oesophagus with involvement of the stomach and liver, a gastrostomy having been performed, the patient was fed entirely through a rubber tube. Such a case afforded an admirable opportunity of determining the effect exerted on the secretion of hydrochloric acid, sodium chloride and certain other mineral salts by introducing varying proportions of those substances directly into the stomach; the point being determined at which, owing to the high osmotic tension of the fluids introduced, no secretion was to be observed. It is not possible to employ an Ewald test meal in such a case, owing to the tendency of the bread, however finely divided, to block up the tube. A soup meal was therefore employed, determinations of nitrogen and chlorides being made in advance. The stomach was washed out with water twice before the administration of each meal. The meal was removed at the end of a period of an hour and a half and all residual material washed out with a fresh quantity of water. By determining the quantity of nitrogen present in the stomach contents it was possible to detect any loss which might have taken place through passage of the contents into the intestinal tract. Organic acids were not present in any large quantity, probably owing to the fact that all residues of meals left in the stomach after four hours were removed.

An inspection of Table XVI demonstrates fairly conclusively that sodium chloride, as such, must have been secreted directly by the cells of the stomach wall, especially in those cases in which no sodium chloride had been included in the diet. On the other hand, a large amount of sodium chloride in a test meal was usually associated with a loss of that substance in the stomach, and since the loss directly into the intestine was extremely small and could be allowed for, it must be supposed that chlorides actually found their way into the system by way of the stomach membrane.* The larger the quantity of hydrochloric introduced the smaller was the actual secretion of that substance and the larger the proportion of sodium chloride produced, indicating a possible reversing of the ordinary hydrochloric secretory functions, alkalies being in some way obtained

TABLE XVI.†

DATE	TEST MEAL			STOMACH CONTENTS		
	NaCl	HCl	Total	NaCl	HCl	Total
Oct. 8....	560	Nil	560	210	210	420
9....	500	“	500	225	150	375
10....	450	“	450	240	70	310
12....	315	“	315	137	140	277
13....	90	“	90	140	70	210
29....	420	“	420	237	87	324
31....	500	“	500	250	60	310
Nov. 3....	175	175	350	175	150	325
4....	280	200	480	230	170	400
5....	20	Nil	20	75	125	200
6....	10	180	190	90	160	250
7....	10	200	210	80	200	280
8....	35	Nil	35	80	120	200
9....	875	“	875	410	70	480
10....	10	290	300	100	160	260

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* This observation is in agreement with that of Bonninger, who found that the addition of large quantities of sodium chloride interfered with the normal secretion and reduced the action of pepsin on proteids.

† Table XVI gives a comparison of the proportions of sodium chloride and hydrochloric present in an exact duplicate of the original test meal, and of the sodium chloride and hydrochloric acid present in the stomach contents removed after an hour and a half. The materials in both cases were unfiltered. The figures represent cubic centimeters of n/10 silver nitrate solution equivalent to the total quantity of chlorine present either in the form of sodium chloride or hydrochloric acid, the estimation being carried out as described in the analytical section. The results observed may be converted into grams of chlorine by multiplying by the factor .00365. The series of experiments was conducted from October 8 to November 10, and at the autopsy of the case on November 25 it was discovered that almost the entire wall of the stomach was infiltrated with carcinoma.

from the stomach walls and a certain proportion of hydrochloric acid actually penetrating in the reverse direction.

The tendency to establish a state of equilibrium not only as regards the total volume and osmotic tension but also between the sodium chloride and the hydrochloric acid is very remarkable in spite of the fact that the infiltrating carcinoma had invaded a great portion of the secreting surface. This tendency is still to be observed in the later experiments carried out less than a fortnight before the death of the patient. In the early experiments the introduction of a large amount of salt was generally associated with the conversion of a considerable portion into hydrochloric acid, the amount of hydrochloric formed in this way greatly diminishing as the disease progressed. On November 3 and 4, when fairly balanced proportions of the sodium chloride and hydrochloric acid were introduced, the state of equilibrium was not very materially altered. On November 5 and 8 very small quantities of sodium chloride and no hydrochloric being introduced in the test meal, sodium chloride and hydrochloric acid were apparently secreted in the proportions of about 1 : 2. November 6, 7 and 10 practically no sodium chloride and large quantities of hydrochloric in excess of the normal introduced in the test meal resulted in a slight loss of hydrochloric acid and a considerable increase in the amount of salt. The high concentration of sodium chloride in the test meal on November 9 was associated with a considerably reduced concentration of salt in the removed stomach contents, and as on October 29 and 30 the introduction of a very large amount of salt with a high osmotic pressure seemed to result in the passage of chlorides through the stomach wall into the system and a slight formation of hydrochloric acid in the stomach either through secretion or the loss of sodium ions, the quantity of acid formed being considerably less than under normal circumstances when moderate or even extremely small quantities of chlorides were administered, as on November 5 and 8.

Through the whole series the tendency of this particular stomach to establish an equilibrium at about 250 units, or .9 to 1 gram of chlorine, is evident. The state of the patient rendered the completion of this series of experiments impossible, and the experimental errors, although reduced to a minimum, introduced sufficient variations to preclude the possibility of working out any mathematical relationships.*

If the test meal was permitted to remain a sufficiently long time in the stomach an osmotic equilibrium representing from .4 to .45° C. was generally established through the interchange of water and salts between the stomach contents and the system. An arrest of the process at the end of an hour to an hour and a half showed, both in cases of high and low osmotic tension of the original test meal, a tendency to the establishment of an equilibrium as near the average as possible, a finding which is more or less in accord with that of Pfeiffer but scarcely in agreement with that of Strauss, who considers that the secretory functions of the cells of the stomach membrane far exceed their tendency to absorb.

It would not of course be possible to base any final conclusions on a single case of this nature, but the observation that a diminished secretion of hydrochloric acid is frequently associated with an increased secretion of sodium chloride justifies the assumption that the failure of the cells to secrete a normal proportion of hydrochloric acid is only in part attributable to a diminished secretory function and may to a certain extent be accounted for as due to faulty or incomplete dissociation of sodium chloride in the blood and the cells concerned, probably due to the influence of sub-oxidation products and toxins produced in, and excreted from the tumor cells. This view tends to support the observation regarding the abnormal decomposition of proteids in cancer stomachs referred to in a previous section. It is also in agreement with the observed diminution in alkalinity and increase in osmotic pressure and sodium chloride content of the blood referred to elsewhere in this report, phenomena which are in all probability directly dependent upon some interference with metabolism resulting in incomplete and faulty oxidation of food stuffs.

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* Similar series of experiments covering shorter periods were carried out on other cases, the same tendency to establish a definite state of equilibrium between NaCl and HCl being observed. In certain cancer cases sodium chloride can apparently almost replace hydrochloric acid in molecular equivalence.

Leo Schwarz, in a valuable paper dealing with the question of chlorine starvation and the alkalinity of the urine, shows that a marked increase of the latter quantity is brought about by introducing sodium chloride and sodium bromide into the stomachs of dogs, bromine apparently functioning as an equivalent for chlorine, whilst nitrates and other mineral salts produce no marked effect on the state of equilibrium of the system.

Reissner concludes that a fairly uniform chlorine content of the stomach is generally to be observed, and that the absence or presence of free hydrochloric and hydrochloric combined with proteids is more or less dependent on the extent to which the original hydrochloric secreted had been neutralized with sodium. He evidently considers that the hydrochloric acid is secreted in any case and subsequently a portion of it neutralized. Our experiments would rather lead us to suppose that a certain proportion, in some cases a considerable amount, of sodium chloride was actually excreted as well as hydrochloric acid; and whilst we have frequently found abnormally large proportions of sodium chloride in cancer cases, as was stated above, other cases of cancer have also been recorded in which practically no hydrochloric acid or sodium chloride was to be found. Whilst in normal stomach contents the phenolphthalein end point, after allowing for phosphates, gives a fairly accurate estimate of the total available hydrochloric acid, as will be seen from Table XVII, this is in no sense true in pathological cases. As was stated in an article on indicators published recently and abstracted in this report, the discrepancies observed can scarcely be accounted for as due entirely to the presence of fatty organic acids and must partially be attributed to the abnormal decomposition of the proteids themselves.

It will be seen that in the first part of this table the available physiological hydrochloric acid estimated by gravimetric methods when added to the acid phosphates is about equal to the phenolphthalein end point, but this is in no sense the case in the cancer results recorded in the next section, although certain of them show very little discrepancy, whilst the big differences observed in the first five cases are in each case partially to be attributed to the influence of lactic acid. There is a residual difference which must be attributed to some type of proteid decomposition. In the last section giving non-cancerous pathological cases it will be seen that certain discrepancies are to be observed, which in view of the fair amount of hydrochloric acid present, can scarcely be attributed to bacterial decomposition.

Table XVII.

Non-Cancer Cases.

CASE	1	2	3	4	5	6	7	8	9	10	11	12
Free and combined HCl	7.7	11.1	9.0	9.4	8.0	5.6	7.1	3.6	2.6	4.1	6.6	6.4
Total phosphates	Nil	Nil	1.5	.6	.3	.4	.8	.8	.4	.4	.2	.6
Sum	7.7	11.1	10.5	10.0	8.3	6.0	7.9	4.4	3.0	4.5	6.8	7.0
Phenolphthalein end point	7.6	10.9	10.6	9.6	8.0	5.9	8.3	4.5	2.8	4.6	6.6	7.1
Difference	—.1	—.2	+.1	—.4	—.3	—.1	.4	+.1	—.2	+.1	—.2	+.1

Cancer Cases.

CASE	1	2	3	4	5	6	7	8
Free and combined HCl	.0	.4	.8	.0	4.0	4.8	2.7	6.2
Total phosphates	.8	.6	.5	.2	1.0	.5	.4	.8
Sum	.8	1.0	1.3	.2	5.0	5.3	3.1	7.0
Phenolphthalein end point	8.8	6.8	4.9	1.1	10.0	5.4	3.3	8.4
Difference	+8.0	+5.8	+3.6	+.9	+5.0	+.1	+.2	+1.4

Pathological Cases Other than Cancer.

CASE	1	2	3	4	5	6	7	8
Free and combined HCl	14.4	8.0	11.0	6.8	7.3	6.1	3.6	2.4
Total phosphates	1.5	.8	1.1	.9	.6	.5	1.0	.4
Sum	15.9	8.8	12.1	7.7	7.9	6.6	4.6	2.8
Phenolphthalein end point	17.0	10.0	15.2	10.1	9.6	4.0	9.0	5.8
Difference	+1.1	1.2	+3.1	+2.4	1.7	—2.6	+4.4	+3.0

IV. *On the osmotic pressure of stomach contents.*—A series of freezing points made on 75 normal and pathological stomach contents gives results varying from .15° to .8° C. lowering of the freezing point. No direct relationship obtains between the freezing point of the stomach contents and the specific gravity, as is the case in urine, owing presumably to the large quantity of starch, etc., usually administered in a test meal. There is not the same difference to observe between the osmotic pressures of the contents of normal and cancer stomachs as is found in the titration values, presumably owing to the increased proportion of salts, sodium chloride and phosphates which are capable of replacing the free acid in maintaining the osmotic pressure in cases in which cancer has already made considerable advance.

The appended Table XVIII gives the comparison of the osmotic pressure of test meals and stomach contents after one and one-half hours, carried out on the same case as that referred to in previous Table XVI. The tendency to establish an equilibrium of osmotic pressure represented by a lowering of the freezing point of about .4° may be observed, all cases in which the osmotic pressure was higher that figure being diminished and when lower increased.*

TABLE XVIII.

Lowering of Freezing Point in Degrees C., Indicating Osmotic Pressure.

Osmotic pressure of meal ...	1.27°	1.20	.93	.91	.67	.51	.36	.29	.27	.19
Osmotic pressure of contents after one hour and a half...	.87°	.79	.72	.67	.58	.47	.41	.39	.39	.34

SUMMARY AND CONCLUSIONS.

1. A series of exact gravimetric determinations makes it apparent that developing cancer of the stomach is generally associated with diminishing secretion of hydrochloric acid in that organ, a point being very frequently reached at which no free mineral acid is to be found.

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*A series of determinations of freezing point and conductivity in comparison with specific gravity, titrations and the amounts of certain chemical constituents of the stomach contents, blood and urine of a series of pathological cases are at present being carried out in this Laboratory and will be reported upon as soon as the material at our disposal is sufficient for that purpose.

2. This decrease in the proportion of hydrochloric acid is frequently associated with an increase in that of the neutral chlorides, and to a certain extent of the phosphates, the evidence inclining rather to support the assumption that the neutral salts are themselves secreted directly from the cells of the stomach wall, and not, as has been assumed by some authors, being produced as the result of interaction between hydrochloric acid normally secreted and the sodium salts of organic acids removed from the disintegrating tumor.

3. When proper precautions are observed in washing the stomach in advance, administering a normal test meal and removing the entire meal after a reasonable period of time has elapsed, no appreciable quantities of lactic acid are to be found except in those cases in which advanced secondary decomposition of the tumor mass has already set in.

4. The secretion of pepsin in normal proportion is maintained to a later stage than is that of hydrochloric acid, a fact which may frequently be demonstrated by the addition of acid to materials derived from a cancerous stomach, when a marked increase in digestion may be noticed on incubation.

5. The proportion of nitrogen present in filtered stomach contents which bears a fairly close relationship to the existing digestive activity is not in any sense proportional to the chlorine secretion.

6. The so-called phosphotungstic filtrate is usually about 20 per cent of the total nitrogen in well-digested mixtures, but may rise as high as 50 and 60 per cent in cases in which, owing to the presence of abnormally large quantities of hydrochloric or the entire absence of that substance, digestion has taken an abnormal course, and is by no means confined exclusively to cancer cases.

7. The titration of stomach contents by means of phloroglucinvanillin drops, alizarin and phenolphthalein with a separate estimation of acid phosphates, permits in a majority of cases, of a fair estimate of the free hydrochloric to the phloroglucinvanillin drops end point and of the total available hydrochloric acid to the phenolphthalein end point; and the range from drops to alizarin and alizarin to phenolphthalein usually bear a certain relationship to nitrogenous products present in solution.

8. The period from alizarin to phenolphthalein after correcting for phosphates is normally about one-fifth of the total nitrogen, but shows wide variation in certain pathological cases.

9. The influence of the phospates either present in the test meal or secreted by the cells of the stomach may be estimated by a process referred to in a previous publication. (See page 119 of this report.)

10. The tryptophan reaction supposed to indicate cancer of the stomach has not been found to give uniform or conclusive results.

In conclusion it must be said that no individual characteristics in the chemical analysis of stomach contents can be looked upon as having any absolute diagnostic value. Only the intelligent combination of the various analyses with the microscopical examination taken in conjunction with the clinical side of the case can be looked upon as in any sense conclusive. On the other hand, something may be gained by the application of work of this nature to the solution of problems associated with the secretion of acids, etc., in the stomach and the suspension of this function under pathological conditions. It is excessively difficult to prove the existence of any specific toxic bodies in tumors, although from work on blood corpuscles recently carried out it appears probable that such conditions actually exist. In any case the great proportion of the toxic effects observed in cancer cachexia may be attributed to the influence of sub-oxidized products produced under the abnormal conditions of metabolism of the cell. The failure to secrete hydrochloric acid might well be due to some slight interference with the equilibrium of the chlorides, phosphates, carbonates, etc., in the blood serum. A slight increase in the viscosity of the cell membranes, increased difficulty in diffusion of chlorine ions in one direction and carbonate ions and others resulting from the oxidation processes in the opposite direction, might well result in such a disturbance of equilibrium as to lead to the suspension of such a sensitive function as the hydrochloric acid secretion. The observed increase of chlorides in the blood, decrease of alkalinity and increase in osmotic pressure, etc., associated with decreased secretion of certain salts in the urine all point in the same direction, but even when it is established that such conditions actually exist in cancer, it is extremely difficult to differentiate between cause and effect. It is for clinicians, aided by pathologists, and to a certain extent by chemists, to differentiate sharply between that which is cause and that which is effect in phenomena of this nature. Either by interference with the physico-chemical equilibrium of the cell a stimulus to proliferation might be induced or the agent producing the stimulation may at the same time play an important role in the production of the phenomenon referred to above, which might consequently be looked upon as a mere secondary reaction. This is a point upon which it is not possible to throw any considerable light at present.

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ON THE REDUCTION OF STARCH IODIDE SOLUTIONS BY MEANS OF THE AQUEOUS EXTRACTS OF TISSUES.

By G. H. A. Clowes, Ph. D.

In a recent publication on chemical methods of differentiating hypernephromata from other tumors of the kidney, the statement is made by Croftan that the reduction of a starch iodide solution may be looked upon as characteristic of the extracts of the adrenals and also of hypernephromata, tumors supposedly derived from adrenal tissue. We are not able to confirm this observation of Croftan's. And further, bearing in mind the known decolorizing effect of ammonia and all alkaline solutions, lecithin and unsaturated fatty acids and even the proteids themselves on iodine solutions, it seemed extremely improbable that such a method as that suggested could have any differential value. It appeared to us necessary to submit the method suggested to a series of severe analytical tests before accepting it as a standard.

Croftan makes no exact statements regarding the strength of the iodine solution which he employed. He merely points out that too great a concentration should be avoided in order that a reaction may be obtained. We therefore carried out a series of experiments in which a n/500 solution of iodine and an equally strong solution of sodium-thio-sulphate were employed as standard solutions and a one per cent starch solution as indicator.

The blood serum, blood corpuscles, urine and various organs of a series of animals, as well as post-mortem material from human beings, were tested quantitatively regarding their reducing power. Our procedure was as follows: a given weight of certain tissue was ground in a mortar with a small quantity of sand and distilled water, repeated extracts being made in this manner until the total volume of fluid after filtration was equal to 100c.c. One c.c. of the starch solution was then added to each of three twenty-five c.c. portions; one was titrated directly by means of the dilute iodine solution; a second was first boiled and then titrated; to a third five c.c. of a n/50 sulphuric acid solution were added before titration. In dealing with the majority of extracts it was observed that no very sharp end point was obtainable, but comparable end points might be found in all cases; that is to say, the first end point was that point at which the iodine was no longer completely decolorized, leaving a faint pinkish-blue tinge through the solution for the space of a few seconds. On titrating further an end point was obtained where a distinct blue remained constant for a space of fully a minute. The solution was usually still capable of effecting a further decolorization of two or three c.c. of iodine solution, provided sufficient time was allowed to elapse, but we found that it was most satisfactory for general purposes to employ the second end point indicated above, at which the blue remained constant for about a minute.

The first materials treated in this manner were derived from a case of cancer of the stomach, in which the patient died as the result of a rupture of the stomach wall and in which it was possible to perform an autopsy within three hours after death. The following table represents the reducing power of the extracts of a series of organs, estimated in cubic centimeters of a n/500 iodine solution for each gram of tissue extracted. The first column represents results obtained on direct titration with iodine in the presence of starch in the cold; the second after treatment with a sufficient amount of dilute acid to render the solution acid to all indicators, and the third after boiling sufficiently to coagulate proteids.

It is interesting to note that using material from different portions of the tumor, of the adrenals and of the spleen, in the first case employing a strong and in the second a weak extract, very nearly the same results were obtained, showing that such a method may have considerable value from a quantitative standpoint. An investigation of the figures shows that nervous tissue obtained from

TABLE XIX.*

ORGAN EXTRACTED.		Cold solution.	Acid solution.	Boiled solution.
Nervous tissue		10.0	3.0 to 4.0 (blue)	
Liver		8.8 to 9.0	4.1	7.3 to 7.7
Pancreas		8.0	6.0	
First adrenal		8.0		
Second adrenal		7.8	6.8	
First tumor gland		7.6	7.6	7.6 to 8.0
Second tumor gland		7.5	7.5	
Spleen	a	7.5	5.0	4.2
	b	7.1 to 7.5		
Lung		5.5 to 6.4		
Kidney		5.0		
Omentum		3.0	2.3	
Fat from omentum (alone)		3.0 to 3.5		
Blood serum from heart		1.5		
Pleural fluid		1.1		
Peritoneal fluid		1.05		

the spinal column has the greatest reducing power in the cold, being slightly higher than that of the tumor, adrenal, spleen, liver and pancreas, all of which are comparatively speaking close to one another. The lungs and kidneys come next, followed by the omentum and other fatty materials which show the smallest reduction of all, indicating clearly that the action in question cannot be attributed to any great extent to the interference of fatty acids. An examination of the figures in the second column shows that after treating with acid, whereby all effects attributable to alkaline solutions and to bodies precipitated by dilute acids are eliminated, the tumor material still produces about the same effect, slightly greater than that of the adrenals, whilst all other organs undergo considerable diminution in reducing power, more especially the extract of nervous tissue, which has fallen to less than one-half of its original strength. The effect of boiling is to produce marked diminution in those cases in which a considerable precipitate is produced.

It must be remembered that the material employed in this series of experiments was obtained at an autopsy, consequently, although not more than a few hours elapsed from the death of the patient to the completion of the experiments, certain post-mortem chemical changes might have intervened sufficient to produce a considerable variation in the reducing power of the individual tissues.

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* These quantities represent the volume in cubic centimeters of a n/500 iodine solution capable of being reduced by the extract of one gram of each of the tissues or sera enumerated in the first column.

The next series recorded in Table XX refers to results obtained on treating the extracts of the organs of normal animals with dilute iodine in the presence of starch.

TABLE XX.

ORGAN EXTRACTED.	Cold solution.	Acid solution.	Boiled solution.
Normal guinea-pig:			
Brains	5.8	5.3	5.7
Liver	13.0	12.0	12.0
Adrenals	15.0	14.5	14.5
Kidneys	14.6	14.2	14.3
Blood	1.5	1.5	....
Normal rabbit:			
Kidneys	10.3	10.0	*8.0
Adrenals	9.5	9.0	9.4
Liver	8.7	8.0	*5.1
Lung	5.0	4.7	5.5
Fat	1.0	1.0	1.0
Blood	1.4	1.4	....

* Heavy precipitate on boiling.

It may be observed that the results in this series do not differ very materially from those obtained in the human autopsy case referred to above. The point most worthy of notice is the reducing power of the adrenal extracts which in both cases lies very close to that of the kidneys and liver; in the case of the guinea-pig slightly higher, in that of the rabbit slightly lower than that of the kidneys. In both cases the kidneys, adrenals and liver head the list with a comparatively high reducing power, whilst the blood serum and fatty tissue both show an extremely low reduction, from one-seventh to one-tenth of that shown by the kidneys. Such results afford further proof that any differentiation of adrenal tissue or tissue supposedly derived from the adrenals by means of the starch iodine reaction is, from a quantitative standpoint, entirely out of the question.

We further made extracts of a tumor of the stomach and of the neighboring pepsin secreting cells in order to observe whether there was any material difference in reducing power, but none was observed, as will be seen from the figures 2.2 and 2.4 given by different portions of the tumor and 2.2 and 2.3 by unaffected portions of the stomach wall. The table referring to this case and subsequent cases is omitted owing to lack of space, but it may be briefly stated that provided exactly identical conditions are maintained through any series of experiments, no differentiation by this means is, so far as we have at present been able to observe, capable of practical application. The reduction of iodine by means of solutions which have been treated previously with an excess of weak acid is slightly less than that of the original solutions, whilst energetic boiling resulting in a precipitation of proteids frequently results in a very material reduction of the reducing power. Fatty materials cause very small reduction. This is also the case with blood serum. Only in two cases was a result as high as 2.5 to 3 c.c. n/500 iodine solution by means of 1 c.c. of serum recorded; in one case the blood of a normal individual having an exceptionally high specific gravity and nitrogen content and in the second that of a case of cancer of the breast with metastases. The usual result was in the neighborhood of 1.4 to 1.6.

Blood corpuscles and leucocytes in the form of a clot produced a reduction ranging from 2 c.c. to 3 c.c. and it is proposed when time permits to make a series of determinations on the blood as a whole, of a series of cases, especially those in which a good iodinophilia is obtained with leucocytes. In all these cases treatment with acid invariably reduced the results, but never to an extent of more than fifteen or twenty per cent.

Examination of urine. The figures obtained in this series of experiments vary widely, from two to fourteen c.c. of iodine being required per c.c. of urine, but it is to be observed that perfectly constant results were obtained from the same specimen of urine, whilst that of the same individual might vary considerably from day to day. The highest results recorded were obtained in a case of advanced diabetes from urine containing six per cent of sugar. On the other hand, a urine obtained from a second diabetic case in which the sugar content was also above five per cent, showed results very little in excess of the normal. In a series of cases in which an impaired metabolism might have been expected to result in the secretion of an excess of bodies capable of producing this reduction of iodine in urine, this test was carried out, but it is not possible to distinguish such cases from the normal, and it will be necessary to carry out a good deal more work in this direction before recording any noteworthy results. The effect of adding an excess of acid to urines previously slightly alkaline was not found to be as great as might have been anticipated.

We also tried the effect of adding an excess of iodine solution to any given material the reducing power of which was to be determined, allowing the mixture to stand for a couple of minutes, titrating back the excess iodine with a sodium-thio-sulphate solution of equal strength and adding starch just before the end point was reached. Such a method was also capable of giving duplicate results on the same material provided sufficient care was exercised, but considerable variations between the results obtained by this method and those obtained by the direct method were frequently observed.

Examination of tumors of the kidney. A couple of cases of hypernephrom which had been preserved in formalin were submitted to examination following the directions given by Croftan and at the same time a sarcoma similarly treated and kidney tissue were submitted to an identical treatment. In no case was a reduction obtained equal to that of normal tissue, and the fact must not be overlooked that formalin itself if not removed is capable of exerting a reducing action upon iodine starch solution.

Summary. 1. It is possible, employing a n/500 iodine solution and a freshly prepared starch solution, to titrate the extracts of a large variety of normal tissues provided the greatest precautions are maintained regarding the uniformity of working conditions. The time factor and the stage at which the end point is recognized are most important and should be determined independently by each individual employing the method, such a method having merely a comparative but no absolute value.

2. The reducing power of an aqueous extract obtained from the adrenals is possessed of a strength averaging about the same as that

obtained from the kidneys and liver, the proportions being such that it appears impossible to differentiate between the adrenals and tumors derived from the adrenals and the other organs of the body by Croftan's method.

3. Blood serum, urine, etc., exert a reducing effect upon the solution in question, and it is proposed to accumulate data bearing upon this question with a view to observing whether such a reaction has any value as a means of diagnosing certain pathological conditions.

September, 1903.

Croftan. Virchow's Archiv. Vol. 169.

A NOTE ON THE INFLUENCE EXERTED BY X-RAYS ON THE METABOLISM OF NORMAL ANIMALS.

By G. H. A. Clowes, Ph. D., and W. W. Plummer, M. D.

As a preliminary step to the investigation of the influence exerted by X-rays on the metabolism of cancer animals, a series of experiments was carried out on normal animals as follows: Eight guinea-pigs of the same origin and weighing 350 grams apiece were isolated in large funnels provided with a wire gauze base so as to facilitate the collection of urine and fæces. Four of them were exposed to the action of the X-rays, two for forty minutes and the remaining two for twenty minutes every second day for a period of thirty days, the four remaining animals being kept as a check on the experimental animals. The pigs were stretched on their backs on a board in such a manner that the abdomen was exposed to the direct force of the rays at a distance of eight inches from the poles, a current of 4 amperes and 110 volts being employed. For the first eight exposures merely a small portion of the hair of the abdomen was removed, but for the last five experiments the skin was shaved clean. All eight pigs received the same uniform diet of carrots, with occasional addition of greens. They were weighed at the same time daily and determinations made of the nitrogen of the urine and fæces and of the phosphoric acid, chlorides, indican, etc., of the urine. Blood counts were made from time to time, both before and after the exposures. At the end of the month the pigs were killed and their blood subjected to chemical analysis and tissues to pathological examination. The curves representing the increase in body weight show practically no deviations under the influence of the periods of X-ray treatment. At the end of the thirty days the four normal pigs showed an average increase of 40 per cent, the X-ray pigs an increase of 39 per cent of their original body weight. A scarcely greater difference was to be observed in the nitrogen loss in the urine and fæces, the normal pigs showing an average daily loss per kilo of body weight, amounting to 411 millegrams, whilst that of the X-ray pigs amounted to 394 millegrams. It is interesting to note that this figure is practically double that of the normal human being. The excretion of phosphates and indican followed the same lines as that of nitrogen, being slightly lower in the X-ray pigs than in the normal, which would scarcely be the case had the action of the X-rays on these animals been associated with a destruction of tissue. Blood counts showed fairly uniformly from four to five million reds, but considerable variations in leucocytes before and after exposure to the rays. The following table, based on the average of several determinations, shows in five cases out of six a considerable diminution in the number of leucocytes shortly after the completion of an experiment. The precaution was taken of regulating the diet of the animals in such a manner that the variations can not be attributed to that source. The chemical analyses of the blood gave practically identical results on the normal pigs and the X-ray pigs, the chlorine content averaging .3 to .35 per cent, the nitrogen 2.5 to 2.8 per cent, the only recognizable difference being a slightly greater degree of alkalinity of the serum of the X-ray pigs as compared with that of the normal.

TABLE.

Leucocyte count before and after exposure to X-rays.

Before.	After.
8,800	5,800
5,000	3,700
11,500	6,500
6,500	6,500 (?)
6,100	4,000
7,200	5,600

April, 1903.

A NOTE ON THE QUANTITATIVE ESTIMATION OF PHOSPHATES IN STOMACH CONTENTS.

By G. H. A. Clowes, Ph. D. (Published in the American Journal of Pharmacy, Vol. 75. July, 1903. No. 7.)

Summary.

It has been shown that the usual method of roughly estimating the effect due to acid phosphates in the titration of stomach contents is incorrect; that one of the three acid affinities of phosphoric acid is saturated at the alizarin end point, and a second at the phenolphthalein end point. Consequently less than one-half of the total effect due to phosphates lies between the diazo (so called) and alizarin end points; while at least an equal effect is exerted on the portion usually looked upon as combined HCl.

A comparatively simple method has been suggested whereby a fairly accurate estimate of the phosphates present and the effect which they exert may be directly determined, dependent

(1) Upon the transition from NaH_2PO_4 to Na_2HPO_4 between the alizarin and phenolphthalein end points;

(2) The transition from Na_2HPO_4 to Na_3PO_4 between the phenolphthalein end point alone and in the presence of $BaCl_2$, whereby the alkaline Na_3PO_4 is converted into $Ba_3(PO_4)_2$ so soon as formed and thus removed from the scene of action.

THE RELATIONSHIP BETWEEN THE FREEZING-POINT DEPRESSION AND SPECIFIC GRAVITY OF URINE, UNDER VARYING CONDITIONS OF METABOLISM, AND ITS CLINICAL VALUE IN THE ESTIMATION OF SUGAR AND ALBUMIN.

By G. H. A. Clowes, Ph. D. (Published in the American Journal of Physiology, Vol. 9. July 1, 1903. No. 5.)

Summary.

1. In normal urine the depression of the freezing point is directly proportional to the specific gravity, and may be determined from the latter by multiplying the figures after the decimal point by 75. (As an example, if the specific gravity is 1.022, $0.022 \times 75 = 1.65$, which is found by experiment to be the depression of the freezing point of such a solution in degrees C.) (See original article, Tables I and II.) This portion of the work is in agreement with the findings of Fuchs.

2. In pathological urines other than those containing sugar and albumin, the same tendency to maintain a constant proportion between the freezing point and specific gravity may be observed, although within rather wider limits than in the case of normal urines. (See original article, Tables III and IV.)

3. The average weight of the molecule or ion in urine may be determined from these figures as approximately 56 to 60, making use of Beckmann's formula,

$$M = E \frac{m}{\Delta},$$

where M = molecular weight of substance dissolved; E = a constant having the value of 18.5 when water is employed as the solvent;

m = the quantity of substance dissolved, assumed in this case to be 2.33 grams of substance for each 0.01 of specific gravity; and
Δ = the observed depression of the freezing point (0.75° for each 0.01 of specific gravity).

4. In cancer, typhoid fever, and other diseases in which the excretion of chlorides is extremely small, the effect exerted upon the freezing point depression is not so great as might be expected from the removal of such a large proportion of the smaller ions. This tendency to maintain a constant state of equilibrium in the average size of the ions and molecules present in the urine may account for the high retention of the products of sub-oxidation and abnormal metabolism, known to exist in these cases. This view of the case may be advanced as a further argument in favor of the therapeutic administration of chlorides to patients on a milk diet, in order that molecular equilibrium of the urine may be maintained, and a more complete elimination of the products of metabolism effected.

5. In diabetic urines, the quantity of sugar may be very readily estimated by determining the lowering of the freezing point of the urine in question, and calculating the theoretical lowering of the freezing point from the specific gravity. The difference between these two quantities in degrees C., when multiplied by 6, gives a very close approximation of the actual percentage of sugar present in the solution. This factor, 6, calculated on a theoretical basis and subsequently confirmed in practice, is dependent on the fact that the molecular weight of sugar is 180, whilst the average of urine solids is below 60. (See original article, Tables VI, VII, VIII, IX, X, and XI.) These results are not all in accord with the observations made by Fuchs, who arrived at his factor, 10, by purely empirical means.

6. The quantity of albumin may be estimated by determining the specific gravity and freezing point in a urine to which a couple of drops of dilute acetic acid has been added, then boiling in order to precipitate the albumin, filtering and once more determining the specific gravity and freezing point. The second specific gravity is reduced to the same ionic concentration as the first, by multiplying its decimal portion by the freezing point before boiling, and dividing by the freezing point obtained after boiling. This calculated spe-

cific gravity is then subtracted from the original specific gravity determined before boiling, and the difference multiplied by the factor 400, which gives the percentage of albumin. (See original article, Table XII.)

7. In a urine containing both albumin and sugar, the former is first estimated by addition of acetic acid, as above, and the freezing point and specific gravity obtained after boiling are employed in the estimation of sugar.

THE METACHROMATISM OF MAST CELL GRANULES AND MUCIN.

By G. H. A. Clowes, Ph. D., and Alice G. Owen. (Published in the Journal of Medical Research. 1904.)

Summary.

The metachromatism exhibited by the granules of mast cells on staining with 10 per cent polychrome methylene blue may be considered as a simple acid-alkali reaction, the compound formed between the methylenazur of the stain and the granules being sufficiently sensitive to acids and alkalis to function as an indicator in the strict chemical sense of the word.

The granules exhibit a *blue coloration with acids* and a *red with alkalies.*

The tendency to change color on passing from acid to alkaline solutions is exhibited by other constituents in the tissue but to a considerably less marked degree.

Whilst the transition from blue to red with alkalies and from red to blue with acids may be observed whatever the nature of the hardening agent previously employed, it should be noted that formalin hardened material shows a far greater tendency to blue and alcohol and sublimate-hardened material to red, even though the original hardening solutions were perfectly neutral. The ability of formalin to combine with ammonia and amido derivatives may well account for this peculiarity.

Oxidizing and reducing agents produce no marked color changes from red to blue or vice versa when stained mast cells are submitted to their action. Reducing agents tend to decolorize the sections as might be anticipated.

The granules are insoluble in weak acids but readily soluble in weak alkalies. Their tendency to dissolve may, however, be ma-

terially affected by their preliminary treatment with various hardening agents and mineral salts.

The globules of mucin present in goblet cells of the intestinal mucosa stain faintly blue with dilute polychrome methylene blue and show a tendency to red on treatment with acids. On heavily overstaining with concentrated polychrome methylene blue and decolorizing with acetic acid the globules are stained red and on subsequent treatment with dilute alkalies are decolorized or rendered slightly blue. The red color may once more be restored by subsequent treatment with dilute acid, but is not so intense as in the original section. The globules in question are also considerably more soluble in alkalies than are the granules of mast cells.

The leucocytes on staining with polychrome methylene blue show much less polychromatic tendency than the mast cells, retaining both in acid and alkaline solutions a violet to blue color up to the point of decolorization.

Since mast cells take polychrome methylene blue much more readily than does mucin and exhibit a blue color with acids and a red with alkalies, whilst mucin is red with acids and decolorized with alkalies; also since the globules of mucin are far more soluble in alkaline solutions than are the mast-cell granules, it may be concluded that they differ very materially in chemical constitution.

Much is already known regarding the effect exerted on the staining properties of bodies of the type of thionin, methylene blue, etc., on introducing acids or basic groups at various points in the molecule; also regarding the effect of acids, alkalies and oxidizing and reducing agents on the compounds thus formed.

A thorough investigation of the nature of polychrome methylene blue from a purely chemical standpoint, following the lines adopted by Michaelis, would be extremely valuable. It should then be possible, making use of the various constituents of this stain under varying conditions of acidity and alkalinity, to obtain considerable information regarding the chemical nature of the granules and other secretory products present in mast cells, leucocytes, etc., and to compare them with bodies of known chemical composition.

This line of research is one which we propose to take up at the first available opportunity and as soon as the stains in question are procurable.

THE THEORY OF INDICATORS AND ITS BEARING ON THE ANALYSIS OF PHYSIOLOGICAL SOLUTIONS BY MEANS OF VOLUMETRIC METHODS.

By G. H. A. Clowes, Ph. D. (Published in the American Journal of Pharmacy. 1904.)

In this paper the physico-chemical theory of indicators was discussed in so far as its principles were found to be applicable to the solution of problems involved in the volumetric analysis of physiological solutions.

Practically all indicators are sensitive to strong acids and strong bases. They may, however, be divided into three distinct classes when tested with a series of weak acids and weak bases of the type present in physiological solutions. At one end of the scale are those which in view of an extremely weak acid affinity are particularly affected by weak acids and are, comparatively speaking, indifferent to weak bases, whilst at the other end of the scale are to be found those which are possessed of strong acid or weak basic combining groups which render them very susceptible to the influence of weak bases but more or less indifferent to that of weak acids.

It is further possible to differentiate between a series of two or more acids or bases present in the same solution, provided one can find indicators, the combining affinity of which to form neutral salts, lies intermediate between those of the bodies to be titrated. A good illustration of this mode of differentiation is the recognition of the three acid groups of phosphoric acid, the first one of which coincides with the first alizarin end point, the second with the second alizarin end point, or with the phenolphthalein end point, and the third with the phenolphthalein end point in the presence of barium chloride;

or aspartic acid, for example, the first acid affinity of which is neutralized at the alizarin or phenolphthalein end point, the second only at the end point of Porrier's blue. Carbonic acid affords an interesting contrast to aspartic acid, neither of its acid groups being strong enough to affect alizarin, one only giving an indication with phenolphthalein and both with Porrier's blue. It will thus be seen that in their behavior towards phenolphthalein and alizarin we have a sharp differentiation between the strongest acid affinities of aspartic and carbonic acid respectively.

At the other end of the scale phloroglucinvanillin is sensitive to the amido group present in aspartic acid and entirely indifferent to the acid groups referred to above. Whilst Porrier's blue is absolutely indifferent to ammonia and all weak basic groups, alizarin is sensitive to ammonia but not to amido groups of the type present in glycocol, leucin and tyrosin. Phloroglucinvanillin as an indicator gives a sharp titration of NH_2 groups of this class and one of the NH_2 groups in asparagin. It is unaffected by the second or amido group of asparagin and those of the same type present in acetamid, formamid, urea, etc.

In discussing the effect of albumoses, peptones, etc., on indicators, it was shown that perfectly pure preparations of these substances show a wide range of variation in titration end points, attributable presumably to the influence of weak basic groups present in the molecule; further, that in advancing hydrolysis the range from the lowest to the highest end points was increased, and that this effect cannot be attributable to the influence of phosphates, organic acids and chlorides to the same extent as has been generally supposed.

The comparison of volumetric with gravimetric analyses of normal and pathological stomach contents showed that provided a plain Ewald, or by preference a purely proteid test meal were employed, and the materials examined in the space of three hours, with very few exceptions the phenolphthalein end point gives a fairly accurate estimate of the total available hydrochloric acid present in the stomach, either in a free state or combined more or less feebly with proteids. The influence exerted by phosphates is usually small and may be allowed for by making a separate estimation of the quantity present according to a method suggested by the writer in a previous paper. The end point of phloroglucinvanillin drops used on a warm plate gives a fairly accurate estimate of the actual free hydrochloric acid. The range of titration from the phloroglucinvanillin end point to that of phenolphthalein, after allowing for the influence of phosphates and traces of organic acid may be said to be a function of the basic affinities of proteids and their decomposition products present in the solution. The total range and the end points of intermediate indicators are dependent upon the total quantity of such bodies present in the solution and the extent of their hydrolysis or decomposition, and provided comparable conditions of experiment are employed this range may be said to be fairly proportionate to the peptic activity of the mixture.

Under pathological conditions where hydrochloric acid is absent or diminished in quantity, and peptic digestion fails to take its normal course, especially where organic acids have been produced under the influence of bacteria, the above rules are no longer applicable. The total range no longer bears the slightest relationship to the titration results; chlorides determined gravimetrically are found to be far below the phenolphthalein end point; the nitrogen present in so-called phosphotungstic filtrate rises above the normal, which is from 20 to 25 per cent of the total nitrogen in a well-digested mixture. All these factors point to the abnormal breaking down of proteids beyond the point normally reached in peptic digestion in the stomach, presumably under the influence of bacterial enzymes functioning in a neutral solution with the liberation of additional weak basic and acid groups, as a result of the abnormal hydrolysis.

In tryptic digestion due allowance must be made for the influence of a known quantity of sodium carbonate which may be estimated independently. Both the acid groups of this body are capable of exerting an influence upon Porrier's blue, whilst only one affects phenolphthalein and other indicators such as alizarin or phloroglucinvanillin are entirely unaffected. After allowing for the influence due to carbonic acid it is found that the range of titration increases with increasing digestion, being at the early stages more or less proportionate to the amount of proteid brought into solution as estimated by the total nitrogen, but subsequently increasing in undue proportion to the total nitrogen as digestion proceeds, with the formation of simpler nitrogenous products.

The bearing which work of this nature may have on the solution of certain problems connected with the constitution of proteids and their decomposition products was also discussed. Titrations of normal blood serum showing a wide variation with different indicators which could not possibly be attributed to the inorganic constituents of the serum were tabulated and the necessity of an agreement upon certain specific indicator end points for serum titration emphasized.

The titration results on urine were shown to be fairly dependent on the amount of phosphates present, the small proportion of amido bases and weak acids present exerting a relatively small effect in normal cases. A normal urine should be acid to phenolphthalein and alkaline to alizarin, the end point lying somewhere between the neutralization points of these indicators. In other words, whilst the first acid group of the phosphates should be neutralized, the third acid group should remain free, varying proportions of the second group being neutralized or not according to the state of equilibrium of the system. Naturally in the presence of any considerable quantity of ammonia which in contradistinction to urea exerts a powerful effect upon alizarin and phenolphthalein, the urine would be less acid, or even alkaline to phenolphthalein and more strongly alkaline to alizarin than is normally the case.

FIFTY-FIRST

ANNUAL REPORT

OF THE

CHILDREN'S AID SOCIETY

For Year Ending October 1, 1903

TRANSMITTED TO THE LEGISLATURE, JANUARY 13, 1904.

ALBANY
OLIVER A. QUAYLE
State Legislative Printer
1904

CHILDREN'S AID SOCIETY

OF THE

CITY OF NEW YORK.

Incorporated January 9, 1855, under the General Act, entitled "An act for the Incorporation of Benevolent, Charitable, Scientific and Missionary Societies," passed April 12, 1848.

FORM OF BEQUEST.

I give and bequeath to the "CHILDREN'S AID SOCIETY," *incorporated in the year 1855, under the Laws of the State of New York, the sum of Dollars, to be used for the purposes of the said Society.*

Subscriptions will be gladly received by the Treasurer, A. B. HEPBURN, Esq., in the Chase National Bank, 83 Cedar Street; by any of the Trustees, or by the Secretary at the Office, 105 East Twenty-second Street.

Donations of new and old clothing, shoes, etc., are very much needed, and may be sent to the office, United Charities Building, Fourth Avenue and Twenty-second Street, or will be called for if the address be sent. Also old toys, children's books, etc., will be gladly received for distribution among the poor children at Christmas, or will be called for.

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STATE OF NEW YORK

No. 12.

IN ASSEMBLY,

JANUARY 13, 1904.

FIFTY-FIRST REPORT

OF THE

CHILDREN'S AID SOCIETY.

To the Legislature:

The extent of the work of the Children's Aid Society during the past year is shown in the following table:

Number of children enrolled in the Industrial Schools		15,816
The daily average attendance	7,841	
Number of children given relief in their homes		10,236
Number of boys and girls sheltered in the lodging-houses		4,302
The daily average	361	
Number of boys at the Farm School		692
The daily average	76	
Number of boys in charge of the Probation Officers		389
Number of children given a week's outing in the Summer Home, Farm and other country places		7,296
Number of women and sick children given a week's outing at the Health Home, Coney Island		3,084

Number of women and children given day outings at the seaside and in the country	8,695
Number of children treated by the Sick Children's Mission	1,522
Number of children placed permanently in family homes during the year	533
Number of children already in family homes under our oversight	1,323
Number of boys and girls placed in homes at wages	336
Number of boys and girls with their parents assisted to emigrate	691
Number of boys and girls returned to relatives	350
Total	55,275

From year to year the annual reports of the Children's Aid Society has recorded with justifiable pride the increased extent of the work, and the success achieved in the effort to combat juvenile ignorance and suffering. It would seem as if such labors would sooner or later clear the city of the many existing evils, and that the burden we have assumed might be lightened. If we had to contend only against the natural increase in population, these efforts would have long since won the day, but the ranks of the helpless and ignorant are recruited constantly by the enormous migration to this port, of whom the most helpless remain in our city, while the more ambitious pass on. The immigration during the year ending June, 1903, to New York was as follows:

Germans	53,421
English	13,961
Irish	24,356
Scandinavians	49,683
Russians	20,710

Poles	64,598
Magyars and Slovaks	50,764
Italians	209,476
Finns	28,752
Greeks, Syrians and all others	116,164
Total	631,885

These hordes of people have been driven out of their native lands by oppression and poverty, and they come to us for shelter, and the opportunity to give their childern the chance for happiness they never had. They are not depraved or degenerate. Many, in fact, are the victims of religious oppression—strong evidence of strength of character—while the rest are of the peasant class, rugged, with the makings of good citizens when the next generation shall have been assimilated into our civilization. It is unfortunate for New York that the helpless and most ignorant of these people remain here, and crowd into the tenements already filled with their fellow-countrymen, and they try to eke out a livelihood in the sweat-shops, cigar factories or rag-pickers' dens, competing to lower the wages already lowered by their predecessors to the starvation point. As a consequence, food is bad and insufficient, clothing and shoes cannot be purchased, and children must labor to help the family with the pittance they can earn by sewing on buttons in the sweat-shops, or working at artificial-flower making, or sorting rags.

Sad as this picture appears, the condition is not hopeless. The trained visitor of our Industrial School is guided to these dark spots by other children, and to the parents she expresses herself vigorously in their own language, showing them the evil consequences of their manner of life, and at the same time bringing to them practical advice and material help to tide them over difficulties. The children are brought to school, and, if necessary, fed, clothed and shod so that they may attend regularly. When we realize that **14,209** visits of this nature were made by our workers during the year, and that **10,236** persons have been given help in their homes, and as we note the happiness of the thousands of little ones in our Industrial Schools, so busy and so hopeful of the future, we recognize the enormous good the Children's Aid Society is doing.

INDUSTRIAL SCHOOLS.

The number of poor children who attended these schools during the year was 15,816, and their nationality is as follows:

United States	3,157
Germans	2,128
English	114
Irish	1,150
Bohemians	821
Italians	5,226
Russians	2,341
Hungarians	522
Slavs, Syrians, etc	357

The importance of these Industrial Schools for the children who are not reached by the public schools will be more and more recognized. As the city builds additional public schools, and succeeds better in providing room for the average child, there will remain a large residuum of children, who, because of sickness or incapacity of parents, must have material help, and must receive individual care to overcome their lawless ways. That this can be done by compulsion in the ordinary crowded institution or truant school we do not believe. Even if it were attempted, the cost is ten times as much per capita as in the small industrial school. The institution will be necessary as a last resort, but the economy of the industrial school, and the advantage of keeping the family together, whereby the good influence of the teacher may uplift the parents through the children, will, as time goes on, make clearer the value of this school work.

MANUAL TRAINING.

The schedule of manual training in the new course of study lately adopted by the Board of Education is adequate to our regular classes. The problem of a suitable course in manual training for the ungraded and truant classes is much more serious, for the reason that the truants attracted to our schools are not committed by a court, and their attendance is voluntary and irregular. Many of them are below the average in attainments, a large number reading and writing with difficulty, and some of them cannot read or write, never having been in school until sought out and brought in by our visitor. Among some of these boys there are inherited or acquired tendencies and habits that render instruction well-nigh impossible during the first few months of school, and they seem unable to apply themselves or take simple directions in school work. It is clear that the ordinary class work is unsuitable and must be elaborated along lines of work which will make school interesting to boys of this character, and which will not require continued concentration on one subject, and the teacher must be kind-hearted and patient, yet forceful and skilled in manual work. When the boys have spent a year in such a class, and have had instruction in the elements of an English education, with more or less work in some handicraft, they become more like normal boys in habits.

To have won a truant from evil influences, and to have inspired him with a desire to become self-respecting, is a victory of the highest importance.

During the past year there has been a marked improvement in the manual training work, owing to a large gift from one of our Trustees, to complete the equipment for our truant classes. This gift has enabled us to purchase tools and supplies for the carpentry and cobbling classes, basket-making and rug-weaving, and for jig saws and tools for woodwork. Skilled supervisors and teachers were employed, and the success of these efforts was recognized at the exhibition in May last, at the United Charities Building, which represented the work of the graded classes of the industrial schools as well as of the kindergartens, truant classes and classes for crippled children. It embraced the written school exercises as well as the drawing, color work, embroidery and handicraft work. The different schools gave examples of dishes prepared by the cooking classes, and the exhibits from the dressmaking and millinery classes were a marked feature. The garments and hats showed careful work and simple, tasteful arrangement.

The work of the truant classes included hammocks, fishnets, chair-caning and cobbling, and well-made furniture, including desks with many pigeonholes, oddly shaped chairs and book-racks, tables, and a seaworthy rowboat to be used by the boys at their summer outing. The showing in beadwork, basket-making and rug-weaving was particularly interesting and very like the Indian designs.

The exhibition of the work of the classes of crippled children was especially attractive, and included paper and silk lampshades in realistic daffodil and chrysanthemum designs. The embroidery and lacemaking of the little girls, and pretty dresses and garments made by them, were particularly noteworthy.

Among the visitors at this exhibition were many experts in manual work, including the Director of Manual Training at the Teachers' College, and all expressed their surprise that such good work could be done by the class of children we reach.

It is the purpose of our Trustees to push on the development of these manual efforts, and a generous gift from another Trustee of the Society has enabled us to employ four additional trained teachers. With enlargement of manual work in view there are rooms in our new West Side Industrial School, at 419 West Thirty-eighth street, near "Hell's Kitchen," for dressmaking, carpentry, cobbling, basket-making and chair-caning, and a small forge for ironwork, all designed especially to make school attractive to the wild, undisciplined, untaught boys and girls of that neighborhood. Miss Haight, who has achieved such remarkable success in this uplifting work, will continue in charge, and her able assistant, Miss Baker, will have the class of truants and incorrigibles, whom she attracts to the school through her extraordinary gift of interesting boys in manual training work.

The Board of Ladies, who have had charge of the benevolent work of the school for so many years, will take charge of this department in the new building. It is through their help and encouragement that so much has been done, and so great a degree of success in training ignorant, neglected children has been achieved.

EVENING SCHOOL.

The new building in West Thirty-eighth street will be well adapted for neighborhood settlement work and for an evening recreative school and for social clubs. When we consider the crowding in the tenements which forces the young people to the streets in the evening, because the home environment is unendurable, and the vice which flourishes on all sides, it is clear that no uplifting work for humanity is more important than to establish evening resorts in a neighborhood such as this. New friends and helpers are needed to take advantage of this opportunity for doing good, and we invite any who may be seeking volunteer work along this line to come forward and form a committee to take this important matter in charge.

WAYWARD BOYS.

Not only is the central office of the Children's Aid Society more and more sought by those who ask advice in regard to the treatment of wayward boys, but, in addition, we are fairly overrun with homeless boys, who, finding the hardships they suffer too great to be borne, come to us for help. Our panacea for all boys in trouble is the Farm School at Valhalla (formerly called Kensico), in Westchester county. To this beautiful haven of refuge we send them all for trial. All alike have a fair chance to prove whether or not they mean well, and the boy with the sullen, hang-dog air, often develops in the sunlight of friendly family life into the honest worker and, later on, the successful man.

During the past year **467** boys who applied at our office for help were sent to our Farm School, there to receive a brief training in farm work, under the observation of Mr. R. N. Brace, a skilful reader of boy character. It is a source of the greatest satisfaction to us that we have our Farm School, so well adapted to receive these victims of early neglect and deprivation. In its cheerful, homelike atmosphere, without walls to imprison the boys, or unnecessary rules to aggravate them, without compulsion, and influenced wholly through friendliness, most of these rough, lawless lads quickly acquire the manner and bearing of country boys living and working on the home farm. Seldom is there a fight or a rough word, and it is amusing to overhear the expressions of indignation by the farm boys at the profanity and bad manners of the "freshies," who come there for a week in the fresh-air season.

Of the 692 admitted at the Farm School during the year, 493 were placed in homes and situations at wages in the country, 70 were found to be runaways and returned to friends, and 129 were worthless or would not stay in the country and were sent back to the city.

Heretofore we have been at a loss what to do for the boys who will not stay on the farm. There are little employment and poor wages for those without skill in any line. Lately, however, an opening has offered for this class of boys, the happy result of the adoption in New Jersey and elsewhere of the new law restricting child labor. Under that law the glass factories are obliged to dispense with the labor of children, so that there is an active demand for boys from fourteen to eighteen to take their places as helpers to the skilled glassblowers. We have taken advantage of this new opening for our boys, and have arranged with factories in New Jersey to establish boys' homes in charge of caretakers approved by our visiting agent, and to give them employment at fair wages.

BOYS' LODGING-HOUSES.

Our constant efforts to find employment for boys in the country and small towns has nearly drained the city of the army of vagrant boys which formerly infested our streets. During the year but 4,302 boys and girls were sheltered in our lodging-houses, as against 13,717 during the year 1883. This enormous falling-off in homeless, wandering boys is a striking fact, and is due to the effectiveness of the child-saving agencies. Successful as this effort is, nevertheless, there are still many useless, irresponsible lads idling about the low resorts. A large proportion of them are graduates of institutions and reformatories and are lacking in moral stamina, making it most difficult to obtain any hold upon them. As the first step toward winning their confidence we are striving to make our lodging-houses more attractive to them, and to surround the boys with homelike influences in order to win them over to a right way of living.

The strong attraction of the streets, the cheap poolrooms, the penny peep shows and Bowery theaters, the chance of winning at games of crap and of picking up things of value or earning unexpected fees for errands or by helping crooks, all these are a strong pull away from our influence. But with constant effort and patience, we are contending against these evils, and not without success, for many of the boys come back in later life and tell us that we saved them. It is an interesting fact also that only six of the lodging-house boys were arrested during the year, a proof that our efforts keep this army of boys out of criminal ways.

The old West Side Lodging-House has been sold, and a new and modern building erected for it at No. 225 West Thirty-fifth street. It is well arranged for the comfort of boys, with a system of shower-baths, a swimming-pool in the basement, and the sitting-room and the dining-room on the first floor are bright and home-like. The new house is near the department stores and uptown newspaper offices, and we believe it will be helpful in affording homeless boys a comfortable home under the best influences and in a locality where employment may be obtained.

To make this home still more effective, we need the help of a group or committee of young business men, who by example and advice will encourage the boys in right living. Thirty-five years ago the late Theodore Roosevelt established this shelter for homeless boys in West Eighteenth street, and with characteristic energy he drew around him a group of family friends and relatives, who have given enthusiastic support and encouragement to the West Side Lodging-House to this day. But inroads have been made among this group of gentlemen; some have passed to their reward, and those who are left are weighted down with great responsibilities, and can give little time to this labor, important as it is to the city's welfare.

BRACE MEMORIAL LODGING-HOUSE.

The old Newsboys' Lodging-House has been renovated and made nearly fireproof, and a handsome entrance and hallway have been made on New Chambers street. New locker rooms and lavatories have been constructed, and the building throughout has been made more cheerful and homelike. The school desks in the large sitting-room have been removed, and tables and chairs substituted for evening use. During the day a large part of the room will be used as a manual training school, equipped with work-tables for the use of carpentry, cobbling, chair-caning and the like industries, while on the floor above are classrooms for regular elementary school work. It is designed that this shall be a newsboys' industrial school, the first of its kind.

Under the terms of the new child-labor law, every newsboy under fourteen must have a school-attendance certificate. The better boys who attend public school will have no difficulty in meeting the legal requirement. But there are a great number of shiftless, untrained boys who find school intolerably irksome. These, because of outrageous behavior, are quickly turned out of the public school, and there are too many of them to lock up in the Truant School. Our experience has taught us that they can be attracted to a special school, where little attempt is made at first to enforce strict discipline, and where the necessary study of the three R's is interspersed with other forms of work attractive to the boyish mind. A few months in a school of this kind modifies the boy's attitude; he earns his school certificate, allowing him to sell papers; and he has acquired the habit of regular attendance, and of accepting orders without instant rebellion.

THE PLACING-OUT DEPARTMENT.

The success of the Children's Aid Society in its best-known field of labor—that of placing orphans and abandoned children in family homes in the country—is so well recognized as hardly to require comment. Formerly there was bitter warfare made upon us by the upholders of institutional methods and by theorists, who could not believe in the good intentions of the great numbers of country dwellers who were willing to take the unattractive little waifs into their homes. From the founding of this Society, the late Charles L. Brace maintained that this Christian missionary spirit among the farmers, particularly of the rich farming communities of the West, was very strong and could be trusted.

WEST SIDE LODGING HOUSE FOR HOMELESS BOYS,
225 West 35th Street.

How true this is, we now know well. Throughout the United States, Canada and Great Britain this method of caring for orphan children is now in operation.

The work of this department during the year has been larger in the number of orphan and abandoned children placed in homes, and more perfect in supervision, than ever before. The number placed in homes for adoption was 533, and at wages 336, being 869 in all. Besides these, 350 runaway boys and girls were returned to parents, and 428 children with their parents were helped to reach friends and employment in distant places. In all, 1,647 children have been sent to the country during the year.

We continue to be responsible for the 1,323 younger children placed in homes in former years, and 1,688 visits were made by our agents during the year to see that they were properly cared for and sent to school, and to remove and replace all those not doing well.

The Children's Aid Society is the placing-out agency of nearly all the non-sectarian institutions of the city, and has recently made a report to the Commissioner of Charities of the city of New York describing in detail the antecedents of all the children received, the family homes in which they were placed, an account of the visits made by our agents and their reports of the children's progress. A copy of the letter which accompanied the report, and a few extracts will be found in the appendix on page 92.

RESULTS.

Since the founding of the Children's Aid Society, in 1853, it has rescued and placed in family homes 23,061 orphans or abandoned children, provided situations at wages in the country for 25,200 older boys and girls, restored 5,551 runaway children to parents. Of those placed in family homes in the West, the vast majority have become farmers or farmers' wives. Of the others, we know of the following noteworthy careers:

Governor of a state	1
Governor of a territory	1
Members of congress	2
Sheriffs	2
District attorneys	2
City attorney	1
Members of state legislatures	4
County commissioners	3
Bankers	27
Merchants	22
Business clerks	460
Lawyers	34
Physicians	17
Postmasters	8
Railroad officials	3
Railroad men	36
Real-estate agents	10
Journalists	15
Teachers	81
High-school principals	4
Superintendent of schools	1
Civil engineer	1
Clergymen	21

Over one thousand entered the army and navy.

What a record is this! No other method of caring for dependent children compares with this in results accomplished.

HOMELESS MOTHERS.

The temporary home for homeless mothers with little children, at No. 311 East Twelfth street, has sheltered 32 poor women with 36 children for a few days, until other arrangements could be made for them. They are sent to us by the Commissioner of Charities, or from other societies, or by missionaries and by the police.

This department has proved itself of the greatest service to these poor women, who have expressed the most unbounded gratitude for the care and shelter. Employment has been found for a number of them, and others have been assisted to join relatives.

ECONOMY OF THE WORK.

The total expenses of our nineteen day and eight evening industrial schools, for salaries, rent, food, clothing, books, fuel, repairs, etc., was $205,767.36, which sum divided by 7,841, the average number in daily attendance, is $26.24, the annual cost for each child. In a great number of cases the help of these day schools enables very poor families to struggle along and avoid the necessity of having to send the children to institutions at a cost to the city of about $140 per annum each.

The expenses during the year of the classes for crippled and deformed children, including the cost of transportation of the children to and from their homes, were $9,430.11; the number of children attending the classes was 212. If we divide the total cost by the enrollment, the cost per capita is but $44.48. The expense of caring for crippled children in an institution would amount to about $200 per annum each.

In our lodging-house 4,302 boys and girls were fed, sheltered and taught during the past year at a total expense of $54,384.70; deducting $17,433.05, being the receipts, including laundry receipts, the net running expense was $36,951.65. Dividing this by the total nightly average, 361, the cost per capita for the year is $102.35, but as the boys remained in the lodging-house so brief a time, the actual average cost of caring for each one would be found by dividing the total cost by 4,302, making the actual average cost of each boy or girl $8.58. When we consider the hundreds of these for whom permanent homes and employment were found during the year, and the hundreds of others saved from starvation or crime during temporary periods of distress, and compare the cost with what the expenses would have been to the community if but a portion of these boys and girls have been sent to reformatories, where for a term of years they would have cost the city $200 or more per annum, we are able to recognize the economy of our lodging-houses to the community.

The Brace Farm School at Kensico gave shelter and training in farm work to 692 boys during the year. Of these 129 were returned to the city as useless for farm employment, 70 were found to be runaways from home and were returned to their parents, and 493 were placed in homes or situations at wages on farms. The average daily number during the year was 76, and as the boys are sufficiently trained in a few weeks for farm homes, the actual cost of training each boy is found by dividing the total expense of $14,573.85 by 493, making the cost per capita of training these city waifs for country employment $29.56. If we compare this with the large sum which it costs to train boys at farm schools where they are retained for two or three years, the extraordinary success and economy of this plan is realized.

The total number of young children for whom homes in families in the country have been found by the Society during the last year was 533, the number of older boys placed in situations at wages in the country was 293, making a total of 826 placed in homes during the year, at a total cost for railroad fares, clothing, food and salaries of placing and visiting agents, of $28,621.66.

The average cost accordingly for each child placed in a home was $34.65. If these children had been placed in an orphanage for three years, which is the average length of stay, at a cost of $140 per annum, it would have cost the community $420 for each child.

During the year poor families numbering 691 persons, mostly children, were assisted by us to various parts of the United States where friends or employment awaited them, thus relieving the city of the great expense it would have incurred if only part of these poor people had become dependents. The cost of this work was $8,036.39, and the larger part of the expense was met by the emigrants themselves.

The number of children who enjoyed for one week each the benefit of our homes by the sea or on the farm was 11,829. Including the expense of salaries of caretakers, railroad and steamboat and car fares, clothing when necessary, and repairs to buildings, the cost was $30,022.95, which amounts to $2.56 per capita per week.

The number of poor children and mothers treated by the Sick Children's Mission in the tenement houses was 1,522. The cost, including the expense of medicines, extra nourishment when necessary, together with the salaries of physicians and visitors, was $2,379.95, or $1.56 per capita.

"LITTLE ITALY."

Two years ago a gentleman, evidently an Italian-American, called upon the writer and explained that he was the editor and part owner of a successful newspaper, and that he felt his success was largely due to the training he received in the Italian School of the Children's Aid Society in Leonard street.

"I owe all I am to your Society," he said, "and I want to acknowledge it in some useful way. If I form a committee of Italians who have been helped by you as I was, and if we raise a fund toward a new school in Little Italy, as it is called, will you accept it?"

Assurance was given that it would be accepted, and placed in a trust company at interest until the time when some benevolent person would complete the fund to the amount required.

"All over this country," he continued, "there are Italians who feel toward you as I do. I believe they will be glad to contribute toward another school in the newer Italian Colony, where the boys and girls may have the care and teaching that I received, and the help with food and clothing these poor people so much need at first."

The committee was organized and has been quite active, frequently sending to the Society the amounts received, until now the fund amounts to $2,837. More than two thousand persons have contributed to it—a striking recognition by the people who most intimately know the facts, of the need of this work. Any one desiring to leave a permanent benefaction to our city could not do a more useful thing than to complete the fund to erect a building where neglect children of Italian immigrants may be trained. Such a gift to the poor will be useful for generations. The land and building together will cost about $100,000.

OUR NEEDS.

We have suffered a great loss in the death of Mrs. Fabbri. For many years she provided dinners for as many of the children of the Italian School as needed this sustenance. Many of these little ones do not have enough to eat, because of the destitution among the newcomers or because of the sickness of the wage-earner. We need the sum of $450 per annum for this purpose.

THE CRIPPLED CHILDREN'S WAGONETTE.

Crippled and deformed children are brought to and from school in comfortable wagonettes built for the purpose. The wagonette in use at our Henrietta School, 224 West Sixty-third street, is too small for the increased number of crippled children who have been found in the tenement houses of that district. It is old and worn out and uncomfortable for these little unfortunates, who are forced to wear plaster casts or steel braces. We urgently appeal for a new wagonette for this school, to cost $775.

TEACHERS' RETIREMENT FUND.

It is a very great satisfaction to the trustees and officers of the Children's Aid Society that we have been able to establish a fund amounting at present to $75,000, which will be the nucleus of a Teachers' Retirement Fund. The fund has been invested, and the income will be divided among the retiring teachers who need the small pension it will afford. Among the 200 teachers of our industrial schools, 22 have given about thirty years of devoted labor to the cause of neglected children, while 40 have served for twenty years. The salaries which the Society is able to pay are small, only about half the amount which the Board of Education pays to the teachers in the public schools for similar work, although our teachers must give longer hours, and the calls upon their sympathy are greater. It has been impossible for our teachers to save enough for their support in old age, and we hope that this fund will increase rapidly.

We appeal to those interested in our schools to contribute toward this special fund, so that the teachers who must soon retire may be relieved in part of anxiety as to the future.

WILLIAM E. DODGE.

During the past year, one who had all his life been greatly interested in all movements looking toward the helping of the poor and unfortunate, has passed over to the majority.

Mr. William E. Dodge died in Bar Harbor on August 9th last. He was a warm friend of C. L. Brace, the founder of this Society, and was closely associated with most of its early friends. During all the Society's history he was a liberal supporter and was deeply interested in the children whom we seek to help and elevate.

No man in this city has so unreservedly devoted himself to help the needy and unfortunate.

He will be greatly missed and sincerely mourned.

CHARLES E. WHITEHEAD.

Mr. Whitehead's interest in the work of the Children's Aid Society is well expressed in the following letter, written when traveling abroad:

Palermo, *March* 5, 1898.

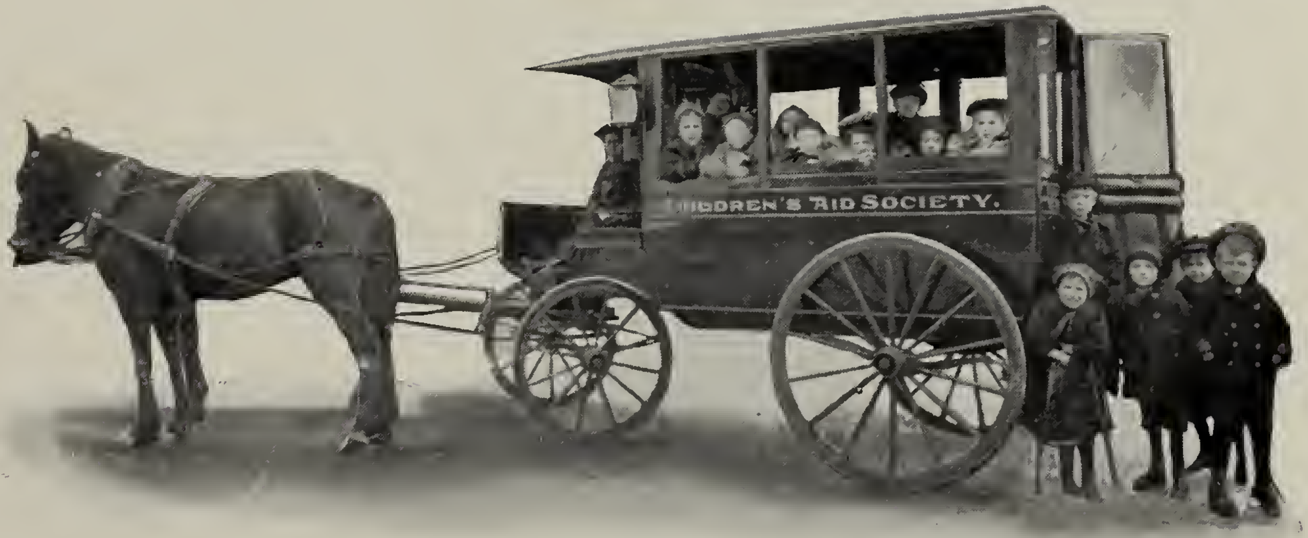
My Dear Mr. Brace:

Your Society report came to me to-day like a bit of sunshine on a dark day. In a country where half the people are so poor that they are fighting for bread, where public free schools and lay charities are unknown, your report seems to be a bright light from afar. It brings to me familiar names and dear faces, and the memory of good deeds.

With many kind remembrances to the members of the Board, I am, as ever,

Cordially yours,

(Signed) Charles E. Whitehead.


HILDREN'S AID SOCIETY.

THE CRIPPLED CHILDREN'S WAGONETTE.

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At a meeting of the Board of Trustees, held April 15, 1903, the following resolution was adopted:

WHEREAS, By the death of Mr. Charles E. Whitehead, on the 21st day of March, 1903, this Board has lost the oldest and one of the best of its members, it is hereby

Resolved, That the Board desires by this record to give expression to its sense of deep personal loss. Mr. Whitehead served as Trustee of the Children's Aid Society for more than thirty-six years, and throughout that time was constant in devotion to the Society's welfare. His interest never flagged, and his efforts to make the work of the Society practical and beneficent did not cease when the pressure of extensive private business affairs would have justified a relaxed business attention.

In 1871 Mr. Whitehead drafted a bill in the interest of factory children, the substance of which was enacted into the first compulsory education law, adopted in 1874 and amended in 1876.

Mr. Whitehead's personality endeared him to all who came within the circle of his wide acquaintance. He was genial, gentle and courteous; and an ever-present sense of kindly humor made him the more welcome to lodging-house boys, school children and teachers. At a time when the affairs of a large city make it increasingly difficult to find men ready to give time and thought to the less fortunate classes, this Board especially deplores the loss of one whose sound judgment and discerning criticism did so much to help the Children's Aid Society in a wise discharge of its duties. He leaves the abiding record of a high-minded man, a good citizen, and a kind friend.

"Who, having won the bounds of man's appointed years, at last
Serenely to his final rest has passed,
While the soft memory of his virtues yet
Lingers like twilight hues when the bright sun has set."

CONCLUSION.

In the detailed reports which follow will be found interesting records of the work done in the various schools, lodging-houses and homes under our charge. Each school and shelter was founded by individual generosity, and each has its own board or committee of ladies who have given time, money and sympathy to the work, and it is largely due to this personal guidance that these labors have been so successful. The reports which follow are the annual reports of these committees, and will be of interest as convincing records of the spirit of love and hopefulness which animates these workers among the children of the poor.

These labors are dependent for their support upon the contributions of the benevolent. In the confident belief that there is no cause so worthy and so necessary as this, we make this appeal.

C. LORING BRACE,
Secretary.

105 East Twenty-second Street,
New York, November 1, 1903.

FIFTY-FIRST ANNUAL REPORT

OF THE

Treasurer of the Children's Aid Society.

To the Trustees of the Children's Aid Society:

Gentlemen—I submit my annual report showing the receipts and expenses of the Children's Aid Society during the past year:

We have received from all sources	$696,057 39
We have paid out	695,628 10
Balance	$429 29

RECEIPTS.

Board of Education, Common School Fund for pupils in Industrial Schools, six months, 1902		$52,470 00
Board of Education, Common School Fund for pupils in Industrial Schools, six months, 1903		54,885 00
City of New York, balance appropriation, 1902		26,165 02
City of New York, account appropriation, 1903		39,562 92
Legacy, Theodore G. Weil	$950 00	
Legacy, John P. Hamilton	175 00	
Legacy, Phoebe Ann Parshall	98 31	
Legacy, Cornelia C. Tompkins	9,500 00	
Legacy, Andrew J. Garvey	748 59	
Legacy, Samuel D. Babcock	4,762 50	
Legacy, Henrietta A. Webb	475 00	
Legacy, Sarah Bayly	1,965 05	
Legacy, Susan Miln	110,323 53	
Legacy, Mary J. Walker	24,193 77	
		153,191 75

Memorial Donations:

"In memoriam Alfred Roe," Emigration	$20 00
"In memoriam"	30 00
"In memoriam A. F. B.," June 18, 1900	21 00
"In memoriam A. F. B.," June 18, 1900, Summer Charities	7 50
"In memoriam James Hervey Sanford"	100 00
"In memoriam James Hervey Sanford," Summer Charities	50 00
"In memoriam L. H. M."	20 00
"In memoriam G. O., Jr.," December 16	37 00
"In memoriam F. M. Monroe," Summer Charities	25 00
"In memoriam B. N. G.," Summer Charities	5 00
"In memory of Robert J. Livingston"	2,000 00
"In memory of Wm. Allen Butler"	500 00
"In memory of John W. Skinner"	25 00
"In memory of F. M. M."	25 00
"In memory of Millicent"	1 00
"In memory of Little Ernst"	25 00
"In memory of W. M. H."	30 00
"In memory of Robert M. Meclin"	5 00
"In memory of George Pierpont Woolsey," Emigration	20 00
"In memory of Little Herman," Summer Charities	10 00
"In memory of Laurie," Summer Charities	25 00
"In memory of F. A. B.," Fresh Air Fund	5 00
"In memory of Capt. E. B. Cobb"	25 00

"In memory of Mabel"	$5 00	
"In memory of John H. Kemp," Summer Charities	5 00	
"In memory of F. C. C.," Fresh Air Fund	10 00	
"In memory of Frederick R. Schmelzel," Emigration	25 00	
		$3,056 50
A Friend, Teachers' Retirement Fund		5,000 00
Mrs. Joseph M. White, for erection of workshop at Brace Farm School		4,000 00
Italian Committee, account new school for Italians		600 00
Italian government subsidy, Italian School		753 61
From Trust Fund for specified objects		28,174 49
From Boys' and Girls' Lodging-Houses		11,557 02
From Brace Farm School		1,000 00
From Industrial Department		6,419 20
Receipts, account cost of transportation		8,095 71
Proceeds, securities sold		4,320 00
Withdrawn from Manhattan Trust Co. for investment (Temporary Home Endowment)		25,000 00
Proceeds sale 201 West 32d street (balance)		159,608 00
Contributions and subscriptions		100,558 88
From all other sources		11,639 29
		$696,057 39

PAYMENTS.

For Industrial Schools—nineteen Day and eight Evening Schools, as follows:

Salaries of Superintendent, teachers (250) and visitors	$135,076 60	
Rent for schoolrooms	4,077 38	
Provisions	10,660 68	
Clothing and special relief	8,960 21	
Books, supplies, fuel, gas, etc.	36,633 45	
Construction and repairs	8,119 44	
Assessments, city of New York	2,239 60	
		$205,767 36

Teachers' Retirement Fund		$1,874 88
Sick Children's Mission, running expenses		2,379 95
Children's Summer Home, running expenses		12,671 25
Health Home, running expenses		9,280 53
Farm for Boys, summer charities, running expenses		7,697 42
Special outings		373 75
Newsboys' Lodging-House, running expenses		12,826 79
Elizabeth Home for Girls, running expenses		10,454 50
Tompkins Square Lodging-House, running expenses		9,097 22
West Side Lodging-House, running expenses		7,793 10
Forty-fourth Street Lodging-House, running expenses		10,126 56
Elizabeth Home Annex, running expenses		3,062 73
Miln Home, running expenses		2,424 98
Brace Farm School, running expenses		14,573 85
Placing-Out Department, salaries, fares, clothing, etc		28,621 66
Emigration Department, railway tickets, etc		8,036 39
Board of children awaiting homes		778 86
Newsboys' Lodging-House, assessment, city of New York		1,018 56
Construction, farm for boys		4,248 65
Construction, Brace Farm School		5,069 79
Salaries, printing, stationery, medical examinations and incidental expenses of executive office		16,170 07
Interest on loans		701 54
Probation department, salaries, fares, etc		2,427 35
Account construction, West-Side Lodging-House	$46,242 26	
Account architect's commission, West Side Lodging-House	1,200 00	
Account equipment, West Side Lodging-House	1,023 80	
		48,466 06
Account construction, New West Side School		43,890 96
Account alterations, Newsboys' Lodging House		5,220 00
Investment, account Teachers' Retirement Fund		4,956 25

Investments' account bequests, etc.	$105,996 25
Deposit in Bankers' Trust Company, Teachers' Retirement Fund	43 75
Special Fund, Mrs. W.	2,674 92
Special Fund, construction account	52,000 00
*Special Fund, *Italian Evening Bulletin,* for new building	600 00
Balance	429 29
	$696,057 39

TABLE OF PAYMENTS TO OCTOBER 1, 1903.

From Mar. 2, 1853, to Feb. 1, 1854	$4,191 55
From Feb. 1, 1854, to Feb. 1, 1855	9,939 88
From Feb. 1, 1855, to Feb. 1, 1856	10,027 09
From Feb. 1, 1856, to Feb. 1, 1857	11,532 75
From Feb. 1, 1857, to Feb. 1, 1858	15,566 42
From Feb. 1, 1858, to Feb. 1, 1859	17,072 40
From Feb. 1, 1859, to Feb. 1, 1860	12,210 11
From Feb. 1, 1860, to Feb. 1, 1861	19,762 92
From Feb. 1, 1861, to Feb. 1, 1862	16,613 98
From Feb. 1, 1862, to Feb. 1, 1863	22,803 88
From Feb. 1, 1863, to Feb. 1, 1864	38,743 90
From Feb. 1, 1864, to Feb. 1, 1865	53,682 46
From Feb. 1, 1865, to Feb. 1, 1866	72,043 65
From Feb. 1, 1866, to Feb. 1, 1867	92,408 37
From Feb. 1, 1867, to Feb. 1, 1868	113,643 99
From Feb. 1, 1868, to Feb. 1, 1869	159,793 11
From Feb. 1, 1869, to Nov. 1, 1869	96,978 59
From Nov. 1, 1869, to Nov. 1, 1870	173,166 78
From Nov. 1, 1870, to Nov. 1, 1871	153,471 55
From Nov. 1, 1871, to Nov. 1, 1872	159,064 71
From Nov. 1, 1872, to Nov. 1, 1873	171,058 11
From Nov. 1, 1873, to Nov. 1, 1874	224,690 70
From Nov. 1, 1874, to Nov. 1, 1875	228,832 65
From Nov. 1, 1875, to Nov. 1, 1876	213,438 16
From Nov. 1, 1876, to Nov. 1, 1877	227,396 26
From Nov. 1, 1877, to Nov. 1, 1878	225,197 44

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*The Special Fund for Italian School Building now amounts to $2,837.04.

From Nov. 1, 1878, to Nov. 1, 1879	$204,340	26
From Nov. 1, 1879, to Nov. 1, 1880	211,007	25
From Nov. 1, 1880, to Nov. 1, 1881	230,919	17
From Nov. 1, 1881, to Nov. 1, 1882	236,069	93
From Nov. 1, 1882, to Nov. 1, 1883	253,865	00
From Nov. 1, 1883 to Nov. 1, 1884	280,702	36
From Nov. 1, 1884, to Nov. 1, 1885	280,713	84
From Nov. 1, 1885, to Nov. 1, 1886	276,916	03
From Nov. 1, 1886, to Nov. 1, 1887	351,739	26
From Nov. 1, 1887, to Nov. 1, 1888	477,365	28
From Nov. 1, 1888, to Nov. 1, 1889	409,561	69
From Nov. 1, 1889, to Nov. 1, 1890	362,007	56
From Nov. 1, 1890, to Nov. 1, 1891	339,700	36
From Nov. 1, 1891, to Nov. 1, 1892	366,323	01
From Nov. 1, 1892, to Nov. 1, 1893	395,845	23
From Nov. 1, 1893, to Nov. 1, 1894	395,337	98
From Nov. 1, 1894, to Nov. 1, 1895	351,521	05
From Nov. 1, 1895, to Nov. 1, 1896	373,447	59
From Nov. 1, 1896, to Nov. 1, 1897	380,466	90
From Nov. 1, 1897, to Nov. 1, 1898	309,394	79
From Nov. 1, 1898, to Oct. 1, 1899	349,039	72
From Oct. 1, 1899, to Oct. 1, 1900	382,536	78
From Oct. 1, 1900, to Oct. 1, 1901	437,263	79
From Oct. 1, 1901, to Oct. 1, 1902	543,109	97
From Oct. 1, 1902, to Oct. 1, 1903	695,628	10
Total amount paid for whole term of years	$11,416,524	41

Respectfully submitted,

A. B. HEPBURN,
Treasurer.

NEW YORK, October 1, 1903.

The undersigned have examined the assets and also the accounts of the Children's Aid Society, and find the accounts correctly set forth in the foregoing report of the Treasurer to October 1st.

GUSTAV E. KISSEL,
ARCHIBALD D. RUSSELL,
Auditing Committee.

NEW YORK, November 24, 1903.

AT THE SUMMER HOME.

LIBRARY
OF THE
UNIVERSITY OF ILLINOIS

Report of the Summer Charities Committee.

Some fifty years ago when the first appeal was sent out in behalf of the Society to the public of this City, it was stated that its object was to help the destitute children of New York by opening Sunday meetings and industrial schools, and gradually, as means should be furnished, to build lodging-houses and organize reading-rooms, it being intended also to employ agents whose sole business should be to care for them. The object of the Society, in a word, was to bring humane and kindly influences to bear on a most forsaken class of children.

The idea of summer charities did not then enter into the minds of those who were active in establishing the Society's work on this island; but as time went on it became apparent to many societies, who like the Children's Aid were established for the benefit of children, that a great field was open in providing for children who never were able to leave the city an opportunity of obtaining fresh country air, with all the freedom and happiness that life in the green fields and under the blue sky means to the unfortunate and neglected child of the crowded East side.

With the growth and development of this great metropolis there has been a corresponding growth in misery, want and suffering, and especially among children, and in consequence the demands upon charitable societies are far in excess of such accommodation as they have the means of providing in order to properly care and receive the helpless child of the streets, and give it in the country new health and strength in exchange for the misery and unhappiness of its existence among the brick walls and stone pavements.

During the past twelve months, according to the official return of our Health Department, there have been 55,518 births in this

Borough of Manhattan; that means that on an average a child has been brought into the world every ten minutes.

The United States Commissioner of Immigration states that for the year just ended 631,885 emigrants have been landed at this Port of New York. These figures may afford abundant food for reflection and may convince us not only of the extraordinary growth in our immediate vicinity, but also of the necessity, that grows greater year by year, of devising means to provide for the children of the poor, to whom charity alone can give the fresh air and the sunshine of the country.

It is true that in the past few years breathing spaces have been afforded in the lower part of the city, and Mulberry Bend Park, Corlears Hook and Seward Parks and the recreation piers have helped and relieved to a considerable extent; still playgrounds are afforded to only a privileged few and Central Park is beyond the reach of many. There is no doubt that all charitable societies are taxed to their utmost in receiving and caring for those little ones who otherwise would only breathe the poisonous air of the tenements. For no one can walk through those crowded streets on the East side any sweltering summer's day, when the heat is stifling and the sun beats down on the hot pavements, and not have his heart moved with pity at the sight of not hundreds but thousands of children with their pale pinched faces and all showing the terrible price that confinement in the crowded city means to them, whose only playground is the sidewalk, who scarcely know the meaning of country life, and are entirely ignorant of all the joys and happiness it may bring.

Some twenty-five years ago The Children's Aid Society began on a somewhat large scale its summer charitable work. It maintains one Summer Home at Bath Beach, located upon a plot of ground containing about four and a quarter acres, with a frontage of 450 feet on Gravesend Bay. The accommodations there, owing to the demands on the Society, have been gradually increased until at the present time they comprise an administration building, main dormitory including children's dining-room and a glass-enclosed pavilion, a cottage for boys, two cottages for girls, one cottage for nursery children and one cottage for crippled children. In addition to this, a fine building was erected as a library and reading-room, and there is also a building with well arranged facilities for the care of clothing, and a washroom for the children. The grounds are well shaded with beautiful trees, and various amusements are provided in the shape of swings, merry-go-rounds, etc. There is also ample accommodation for bathing, and every pleasant day the beach is crowded with almost the entire company, enjoying the salt water as only children living in the hot tenements can. Three hundred and fifty children were received every Monday morning who remained during the week, 4,009 in all, and including the day excursionists of 1,876, some 5,876 children have been numbered among our beneficiaries there during the season.

The Society also maintains a Health Home at Coney Island. This is situated upon a plot of ground comprising about nine acres. The building on the ocean side has a frontage on the water of 250 feet; besides a main building and dormitory there are some eight detached cottages and two bathing pavilions near the high-water line connected with the other buildings by covered walks. Some 300 children are received there every Monday who remain during the week; besides, there are also day excursions, a total of 7,584 mothers, including babies and older children, having enjoyed the sea breezes and invigorating ocean air during the past summer there, 3,084 mothers and children remaining a week and 4,500 coming for the day.

The older children enjoy every hour playing on the beach and running to and fro over the smooth sands with shouts of joy. Mothers sit there with their babies watching the blue ocean and drinking in the pure air that blows from over the sea. There are great facilities for bathing and the scene is a happy one on every pleasant day and cannot fail to impress any observer with the good a health home by the sea can do for the poor. It brings back color to the pale little faces and assures the anxious mother that her baby's life, slowly flickering out in the hot city and hanging so tremblingly in the balance there can now be saved to her.

The Farm School at Kensico, Westchester county, forms another important feature of the Children's Aid Society's summer work. This comprises 125 acres; there is a main administration building with dormitories, cottage for summer boys, schoolhouse, infirmary, laundry building, workshop and gymnasium. An outside building some distance from the main house has been erected so that the fresh air boys can be kept separated from the regular Farm School boys. Two thousand seven hundred and three boys have been received there during the past summer. These leave the city on Monday and return on Saturday, 250 at a time. This does not include, of course, the regular number of boys who are at the Farm for the purpose of being instructed, some 80 in number, and for whom homes are generally found in the West.

There are many attractions, of course, at the Farm, one of the new features being a swimming pool about 75 feet wide, 100 in length and from 2 to 4 in depth. This was excavated by the regular boys during the past year, and with the help and instruction of a mason the pool was paved and walls were built of stones picked up in the fields and cemented. This pool has proved exceedingly useful, a small brook supplying the water. The Society has also found itself enabled to make very great improvement in the caretaking staff by employing college men. There were three Yale undergraduates and one Cornell undergraduate, besides the regular staff in charge. These young men play ball with the boys and are very helpful in keeping order.

In fact, our work each year rounds out more fully owing to new experience gained. At the Summer Home special attention has been given to the outings for crippled and deformed children, who have their separate cottages with nurses and caretakers to look after their comfort and keep them interested in quiet amusements. A wagonette and team are maintained and the children are driven several times each week. The Society has recently availed itself of its new cottage for nursery children erected especially for this purpose and admirably adapted in all its details for their care. The dining-room is fitted with low tables and chairs and adjoining is a commodious kindergarten room for play on rainy days. As to the work of the Society, 14,056 children have been received during the past summer and given the benefits of fresh country air and good food; and in addition to these there have been 2,116 poor mothers with children cared for, a total of 16,172 all told.

The Sick Children's Mission is a connecting link with the Health Home at West End, Coney Island. This is located at No. 287 East Broadway, and maintains nurses and visiting physicians who go through the tenement districts and find out where the sick babies and ailing children are located and arrange for them to spend a week or more at our home. The lives of many infants have thus been saved where a few days in the hot city would have been probably fatal. Other parties are made up of the poorest children who attend the 21 industrial schools maintained by the Society in this borough, tickets being distributed during the season to those who will be the most benefited. These homes and the Sick Children's Mission are only kept open during the heated season and form a valuable and important part of the Society's summer charitable work, and the cost of all this so generously contributed by the always generous public,—the cost of caring, receiving and feeding 9,796 mothers, babies and children has amounted to less than $3.03 per capita each week, and it gave to that mother with her baby, or to some poor, neglected child, a week's outing, while the feeding and care of the 6,376 who came only for the day has occasioned no extra expense whatever.

How many lives have been saved by this timely care—how much good has been done for neglected humanity—how much joy and happiness has been given to the poor children of the tenements? You can read the answer in their faces where you will find new health and strength, new vigor and new vitality.

"God help the poor!" How often do we hear these words? But those of us interested in this feature of charitable work—in this feature, I may say, of Christian work—giving to the children of the slums a week or more in the country; giving to the child the view of green fields and wild flowers; giving the pure, healthful life of the country in exchange for the squalor and evil that may surround that child in the city; when we realize what an infinitesimal drop in the bucket is all our work, and when we consider the vast numbers still uncared for and still left to find playgrounds and fresh air as best they can,—how often may we not exclaim, "God help the children of the poor!"

Let us be thankful that this great work of summer charities goes on and that its good results are more and more far reaching every year, and let us all have faith that as time may solve many problems, so this problem of how to care for the neglected child who is still uncared for, may be solved through the earnest and zealous efforts of those who are interested in this most humane and noble work.

F. Delano Weekes,
Chairman, Fresh Air Committee.

New York, October 26, 1903.

Annual Report of the Sick Children's Mission.

By an energetic, faithful and successful discharge of their duties during the past summer, the physicians of the Sick Children's Mission have fully sustained the reputation they have acquired as a great life-saving corps.

Detailed reports which we have received from physicians, visitors and nurses bear ample testimony to the urgent necessity for such a mission as ours, and also to the gratifying success which has attended every department of the work. The summer was the coolest in the records of the weather bureau, but while excessive heat is the prime factor in producing sickness among the little children of the tenements in summer, long experience has demonstrated the fact that other conditions besides extreme heat undermine the health of these poor children. The death rate among children under five years of age in the borough of Manhattan averaged 1,200 a month last summer, the contributing causes being summer complaint, improper feeding, unsuitable clothing, the unsanitary condition of their homes and in many cases the actual want of food.

It is this latter and most pathetic fact that emphasizes the very great importance of the dietary department of the Sick Children's Mission.

The following, taken from the report of the physician who served in the Tenth ward, affords a touching illustration:

"In a rear tenement in Essex street to which I was sent, I found the mother lying on the floor sick at the stomach and writhing with pain from cramps; one child was lying at her side presenting unmistakable symptoms of cholera infantum; two other children were ill with bronchitis and tonsilitis, while a fourth child was suffering from rheumatism. It was a veritable clinic. There was scarcely any food in the house; the father had been out of work owing to strikes and had left the city in search of employment. I prescribed for the entire family, got the medicine myself, procured suitable food from the Mission headquarters, and after a while had the pleasure of seeing mother and children restored to health. It is only such a charity as the Sick Children's Mission that makes results like these possible."

Another physician whose work was very successful last season and whose district included that notorious block of tenements on the upper West side, between Sixty-first and Sixty-second streets, which contains about 7,000 inhabitants, including 2,400 children —refers to a number of cases where the lives of children were saved by special food supplied by the mission and which the mothers could not afford to purchase themselves. This physician mentions also a number of almost hopeless cases which were cured by a week's sojourn at the Health Home, Coney Island. One of our oldest physicians in point of service makes this remarkable statement: Some people are disposed to attribute much of the destitution prevailing at times in the tenement districts to intemperance. But last summer I personally visited 5,000 families in connection with my work for the Sick Children's Mission and found only one case where the man and wife were intoxicated and where intemperance was evidently the cause of destitution.

Another doctor whose work was in the Seventh Ward, principally in Water and Cherry streets, closes his report as follows:

"If the rich friends of the Children's Aid Society only knew how many children's lives are saved every summer by the food supplied by their Sick Children's Mission and without which the doctor's best efforts would be of little use, you would never want for plenty of funds to carry on your blessed work."

A factor contributing largely to the success of our work this year was the intelligent, skilful, devoted and most helpful cooperation of the trained nurses whom we had the good fortune to secure as visitors. They visited every family in which a sick child was treated by our physicians, and were always courteously and gratefully received.

Their instruction to poor mothers regarding the feeding, clothing and general management of young children not only supplemented the doctor's treatment of children who were already ill, but certainly was the means in many instances of preventing well children from becoming sick.

We like to mention the fact, occasionally, that the Sick Children's Mission is the oldest of the children's summer charities, and we believe it never accomplished a better work among the sick children of the poor than in this, the thirty-second year of its age.

Visiting physicians employed	10
Druggists filling prescriptions at cost price	15
Visitors and trained nurses employed	7
Sick children treated medically	1,522
Sick mothers treated medically	54
Deaths among patients	47
Medical and food prescriptions filled	3,235
Destitute families referred to appropriate charities	67
Health circulars and information cards distributed	4,200
Parents enabled to find employment	52
Contagious diseases referred to Health Board	32
Children transferred to hospitals for treatment	12

Respectfully submitted,

GEORGE CALDER,

Superintendent.

THE BRACE MEMORIAL FARM SCHOOL.

(Established in 1894 by Mrs. Joseph M. White.)

Kensico Station, Westchester County, New York.

The following table shows the disposition of the boys received at the Farm School during the past year:

Placed in homes and situations in the vicinity	232
Placed in homes in the West and South	261
Returned to relatives	70
Left the Farm School or dismissed	129
Total number during the year	692
Average number during the year	76
Total number of Fresh Air boys, one week each	2,703

These figures again show an increase over former years, made possible by the generous gift, a year and a half ago, of a pretty cottage for the smallest boys. But not alone in numbers has our work gained. It has also gained in effectiveness, largely due to the employment of a man of large heart, long connected with our western work, to take charge of the boys of the Farm School, and give to each the individual attention he needs, thus leaving the able Superintendent free to devote his energies to the successful management of so large a plant.

We have been enabled by another generous gift to diversify our work, having just completed the erection of a building containing blacksmithing, carpentry and painting shops, where boys who do not seem adapted to farming, or who need a longer course of training, are kept for several months learning the rudiments of these trades. The upper floor of this building is fitted up as a gymnasium, and here in stormy weather, when work or play out of doors is uncomfortable, the boys can work off their superfluous energy. It is too early yet to speak of results attained, but there can be no doubt that the building adds materially to our resources, and will give us the chance to gain the interest of some to whom other kinds of work do not appeal.

As of old our work in the West and South is our main reliance. Nowhere else are the chances for the future so good, nor the achievements of the past so gratifying. One case among many will illustrate our methods: Three years ago there came to us a little Irish boy of fourteen, John S. by name. We informed his mother of his whereabouts and she promptly took him home despite his tears and entreaties. In two weeks he was back at the Farm School. We learned that his mother was in the habit of spending his earnings for drink, and when drunk, abusing him shamefully. Mr. Herbert Vandyke, a large-hearted lawyer, who acts as guardian for our boys who enter the navy, took the case in hand and had himself appointed guardian. Soon after that, John went West and was placed in the home of a kind family in Iowa. He was given good schooling and good training, and is now working for wages and doing well. The following letter tells of his present life:

M——, Iowa, August 10, 1903.

Dear Mr. Brace:

I write these few lines to let you know that I am doing nicely and I am a good boy. I and Mr. T——— were stacking grain over at Walter, and Otto and myself were helping. We had two teams to load with. We will stack our grain to-morrow. Otto will be over to help tie. I write to my folks, and they ask me when I will come home.

Otto and I went to school last winter. We were good boys to the Teacher. I don't drink any strong drinks, or smoke or chew.

I am going to grow up to be a good Christian boy, and save my money and buy me a farm.

I am at Mr. Alex T———, and he is good to me, and I like to work for him. There will be a show here Tuesday, the 12th, and it is the Golemer Bros., and they expect 5,000 people. It is the biggest show that has been in M———.

Mr. Brace, have you one of the photos of the boys that came when I did? I would like to have one if you have it. You gave Otto one with the company of boys that came out to Spring Valley.

I send you my love, and good wishes to you and Mr. Tice and Mr. Wendell and Mr. Goaf. I will close my letter. Good by.

From your friend,
JOHN S———.

How different is his lot from the dangers and degradations that would have been his share if left in his mother's care, or from the constrained life of an inmate of one of the large institutions! By our method the boy was saved at the expense of perhaps fifty dollars. By taking the second alternative, he would have met almost certain ruin. By following the third course, he would have cost the city at least $300, and even then his future would not have been assured. Hundreds of such cases exist today, that might be brought to us by settlements and societies, were the workers not hampered by sentimental regard for the rights of parents who should be allowed no rights, and who sacrifice the happiness and welfare of the individual child with ironclad rules in regard to creed.

My attempts to gain a foothold among the ranches and stock-farms of Texas have been very successful. By employing as agent a man of good judgment who has spent years in the cattle-raising section of the state, we have been able to find homes there for over twenty large boys, many of whom would not have cared for the routine work and monotony of ordinary farming. Not only is there an opening for grown boys, with better wages than anywhere else in the country, but occasionally homes can be found for little boys, with a class of stockmen who would take pride in a bright boy and give him chances that the average farmer could not afford.

The work of finding homes for our smaller boys has been carried on with the same success as in the past, by our corps of earnest and conscientious agents, and many a child born in poverty and wretchedness has been transplanted to homes of comfort and happiness. Although the number thus taken care of is large, still each child is watched over and his interests guarded, as carefully and thoroughly as though the number were only half as large.

Among the many who help us to accomplish so much with such difficult material, must be mentioned again, Mr. Evert Jansen Wendell. By the exercise of remarkable patience and tact, and by his unbounded love, he so wins their confidence and affection that they turn to him in every trouble. Many a boy who has left his home and drifted out of our sight is thus brought back to us and helped when he most needs help.

As in former years, we have been generously assisted by Dr. J. E. Giles. His treatment of their eyes has placed some of our boys under obligations they can never repay, in one or two cases saving them from total blindness.

In closing, I must make reference to the loss we have sustained in the death of our valued agent, Mr. D. L. Covill. His devotion to the interests of the children under his supervision was complete, and we and the children alike will miss him.

ROBERT N. BRACE,
Superintendent of Emigration.

PRODUCE OF BRACE FARM SCHOOL.

Hay	90	tons	at	$20.00	$1,800 00
Straw	8	tons	"	16.00	128 00
Green fodder					450 00
Oats	125	bushels	at	.50	62 50
String beans	79	bushels	"	.50	39 50
Sweet corn	98	bushels	"	.70	68 60
Potatoes	200	bushels	"	1.00	200 00
Onions	12	bushels	"	.90	10 80
Cucumbers	50	bushels	"	.83	41 50
Cabbage	2,682	heads	"	.05	134 10
Carrots	8	bushels	"	1.00	8 00
Plums	30	bushels	"	3.00	90 00
Apples	400	barrels	"	....	311 00
Eggs	534	dozen	"	....	140 00
Currants	84	quarts	"	.12	10 08
Milk (home consumed)	23,450	quarts	"	.04	938 00
Milk (sold)	81,200	quarts	"	....	3,248 00
					$7,672 08

F. W. Goff, *Superintendent.*

THE NEWSBOYS' LODGING-HOUSE.

The Brace Memorial Lodging-House for Boys, Corner William and New Chambers Streets.

The alterations and structural improvements to the building necessitated the closing of the house on the 24th of July, to open about November 1st. The building has been made nearly fireproof and will be much more comfortable and homelike and with the best facilities for industrial classes for the boys.

Every new-comer is given a slip with a series of questions printed thereon, which he is requested to answer. Some of the questions are: "What is your name?" "Where born?" "When?" "Are your parents living?" "Where have you stayed for the past week?" "Give name and address of some relative or friend?" etc. If an address is given, we immediately make a request for information concerning the new applicant. In this way, runaways are invariably returned to their homes.

A boy of fourteen had been wandering for two months and finally drifted in here. We soon learned that W—— O'C—— had left a respectable home and parents in Georgia. The parents were notified and the father immediately replied, "I can assure you it was certainly a relief to hear from my son and to know that he is well. This is the first news we have had from him since Jan. 17th, and his mother and myself were distracted to death to know what had become of him. We have prayed that he might meet some person who would be kind to him and give him some word of encouragement." The father sent on the ticket and the boy was returned to his home.

It is a sad fact that numbers of boys are compelled to leave home on account of drunken parents, cruel step-mothers and step-

A YOUNG FARMER.

LIBRARY
OF THE
UNIVERSITY OF ILLINOIS

fathers also drive children away. A special case which I had to investigate last week is that of a fine, bright boy who is very anxious to go to the West. On being told that no boys would be taken without the consent of the parents or guardians, the boy admitted the identity of his parents. He declared, however, that he would never return home, even if his parents did not consent. He told that his father was always drunk and beat the mother every Saturday night. The family had moved since John left and I had some difficulty in locating them. Finally, I was directed to a house in the lower East side of the city. On entering a small room in the rear of the second floor, I saw the mother intoxicated and four small children with her. She could not speak audibly and was vainly trying to feed the baby.

Such cases as these frequently come to our notice. In dealing with the rough and vicious street boy, we often find it difficult to correct the effects of street influences on him and of his wicked associates. We endeavor in every possible way to elevate their characters and promote their comfort. We lead them to clearly understand that the lodging house is not a permanent home, and that the benefits which we extend are only supplementary to the efforts which all are expected to make toward helping themselves.

During ten months of the past year, 1,154 different boys had registered; 78 per cent. of these have been placed in homes and employment. That is, 80 were sent to the Farm School, 78 returned to friends and 753 provided with homes and employment.

The results of our labors can never be fully realized. Of the greater number who come under our care, many go away of whom we hear no more. From those who are in communication with us, we receive encouraging reports. One, who had fully appreciated the benefits during his sojourn here, writes: "When we pray for the kindly fruits of this earth, let us also pray for those havens of spiritual and moral elevations—Newsboys' Homes." And again, H——— F——— sends us this cheerful message: "With the compliments of one who holds the Brace Memorial Lodging House in grateful remembrance and the precepts of which he tries to follow." H——— was a hustling newsboy and while with us was a regular attendant at our evening school. He worked his way through a course of study in stenography and typewriting and now holds a prominent position in a large publishing house in one of our western cities.

The boys have been more thrifty than the previous year—139 depositors having saved $500.74. We have in our possession several bankbooks which have been left with us for safe-keeping by boys who are now in better circumstances. Two of these books show accounts in three figures; another has reached the one thousand mark; the owner still holds the position in which I placed him two years ago, and is earning $14 a week.

We are indebted to Mr. G. E. Kissel for his kind donation which enabled us to refurnish the gymnasium and procure games for our boys. The wrestling matches, basketball contests, crockinole games and other attractive features have been great inducements in keeping the boys "at home." Our baseball team has had fine sport. They have shown great skill in playing, losing but two games this summer. I succeeded in obtaining for them the privilege of using some lots in Flushing, Long Island, where they were not molested by the police. The boys extend their thanks to Mr. Clement March for the suits which he provided. We also gratefully acknowledge his generous fund wherewith shoes, clothing, underwear, etc., were purchased.

No words can convey the sense of our gratitude and indebtedness to our trustees, Mr. C. Loring Brace, Mr. G. E. Kissel, Mr. W. C. Osborn, and Mr. E. J. Wendell, who have manifested an ardent interest in all that pertains to the welfare of our boys.

We also desire to acknowledge the kindness of Mr. E. McK. Whiting, Mr. Harris E. Adriance and numerous friends of long standing who have regularly aided us in our work.

On each holiday the boys have been feasted and entertained—the Thanksgiving dinner being provided by Mr. W. W. Astor, the Christmas feast instituted many years ago by William M. Fliess, and the dinner on Washington's Birthday, for which the Hon. Randolph Guggenheimer amply provided. A regular course dinner, followed by a fine musical entertainment, was given in the spring by Mrs. G. T. Bliss.

We wish to thank Miss Henriette Markstein and other kind friends for various entertainments. No feature of the home is more popular than the Newsboys' Home Orchestra. Under the direction of Mr. John Paul they have attained a high degree of efficiency. With comparatively few exceptions the band has been organized from boys and young men who have been at some time engaged in the sale of newspapers. Every member holds some position of trust as a livelihood, and his connection with the orchestra is merely incidental.

Different boys registered	1,154
Lodgings furnished	26,082
Meals furnished	43,451
Restored to friends	78
Provided with homes and employment	480
Provided with temporary employment	273
Sent to Farm School	80

Sent to hospital	8
Average number of nightly lodgers	90
Number of depositors in bank	139
Amount deposited	$500 47

Respectfully submitted,

RUDOLPH HEIG,
Superintendent.

West Side Industrial School.

Board of Managers.

Mrs. A. Newbold Morris, *President.*
Mrs. Beverley Robinson, *Vice-President.*
Mrs. H. Mortimer Brooks.
Miss Bunker.
Mrs. Henry D. Babcock.
Miss Emma H. Delafield.
Mrs. Bache Emmet.
Miss Laura J. Edwards.
Mrs. Walter B. James.
Mrs. Walter Jennings.
Miss Julia Livingston.
Miss Clarisse H. Livingston.
Mrs. Henry E. Howland.
Mrs. Richard H. Derby, *Treasurer.*
Miss Alice D. Seward, *Secretary.*
Miss Eva V. C. Morris.
Mrs. Charles F. Ostrander.
Mrs. O. E. Schmidt.
Miss Josephine Stevens.
Miss Florence A. Schenck.
Miss Carlie M. Schenck.
Mrs. William J. Matheson.
Mrs. Samuel A. Tucker.
Mrs. Herman Vogel.
Mrs. Timothy Williams.

RECEIPTS.

Mrs. A. Newbold Morris	$440 00
Miss Morris	25 00
Miss Schermerhorn	400 00
Miss Schenck	135 00
Mrs. Scarborough	110 00
Miss Julia Livingston	98 00
Miss Josephine Stevens	20 00
Miss Delafield	34 00
Mrs. H. A. Babcock	55 00

Mrs. Bache Emmet	$15 00
Mrs. R. R. Derby	25 00
Mr. R. Percy Alden	25 00
Mrs. S. A. Tucker	25 00
Miss Clarisse Livingston	25 00
Mrs. Howland	25 00
Mrs. James	35 00
Miss Seward	20 00
Mrs. Beverley Robinson	10 00
Mrs. Vogel	10 00
Miss Edwards	10 00
Miss Bunker	15 00
Mrs. Mortimer Brooks	25 00
Mrs. John Minturn	25 00
Mrs. Charles Stickney	25 00
Mrs. Seward	25 00
Mrs. Williams	25 00
Mrs. Jennings	25 00
Miss Tina Morris	25 00
Mrs. Cutting	25 00
Miss Albertina Winthrop	25 00
Mrs. Baylies	30 00
Fines	22 00
Total	$1,834 00
Balance on hand September 1, 1902	231 38
	$2,065 38
Expenses	1,699 23
Balance on hand September 1, 1903	$366 15

EXPENSES.

Hot dinners	$718 18
Salary	275 00
Shoes	350 00
Bath	50 00
Bathing children	53 00

Piano hire for kindergarten	$37 00
Toys for Christmas tree	32 54
Presents	23 00
Christmas dinner	61 91
Emergencies	56 20
Insurance on piano	2 00
Dolls for 1903	40 50
Total	$1,699 23

SARAH C. DERBY,
Treasurer.

Secretary's Report.

The proposed erection of the new station of the Pennsylvania Railway Company on the site occupied for eighteen years by the West Side School, gave a special interest to the work during 1902-3. "The last year in the old building" was a phrase on many lips when the school opened in September. To the children this meant little save the excitement of moving to new quarters, but to those who had been present eighteen years before when the doors of the building were opened and who have lived to see them closed, this trite phrase was the open sesame to a mine of gratifying thoughts. The remembrance of much good accomplished and the recollection of many letters received from those whose names are still on the old registers show that the West Side School has held its own in the march of civilization.

In the 50th Annual Report of the Children's Aid Society, issued last year, many statistics were given and many contrasts drawn to show how successful have been the methods employed at this school. Now that it is moving away, a picture of the locality in 1885 comes naturally to the mind. The poverty, ignorance and lawlessness of the neighborhood was appalling, and the bettered conditions which now exist cannot but be traced to the capable and self-sacrificing teachers who sent forth their scholars day by day to carry, like so many little missionaries, influences of good into their homes.

In consequence of the proposed new station the neighborhood had become somewhat depleted when the school opened in September, 1902, but it was gratifying to enter as many as 260 names. The usual studies were begun, and a new departure made in the manual training class by the introduction of carpentry, wood-turning, chair-caning, basketry and weaving. Besides the interest shown in these branches there is nothing to mention which makes the year different from those which preceded it. Every month the managers have read at their regular meetings a report of work successfully continued on old lines. It is pleasing to note that after the holiday attractions were over there was no decrease in the number of scholars. In December, 217 names were entered. In May the list increased to 272.

In the death of Miss Sarah Schermerhorn each member of the Board feels a sense of personal loss. Her ever ready sympathy, her kindly words and unselfish devotion to the interests of the school, endeared her to the managers and inspired a deep appreciation of her work as a leading member of the Board. Her aid and encouragement will be greatly missed at the monthly meetings.

In looking forward to the first year in the new building at Thirty-eighth street and Tenth avenue the managers realize that extra exertion must be made. They begin their work in the confident hope that those who have helped them by their cooperation and sympathy will continue to aid them during the coming winter.

ALICE D. SEWARD,
Secretary.

West Side School, 417 and 419 West Thirty-eighth Street.

Report of the Principal.

On October 1st, the West Side School moved into its new building on West Thirty-eighth street, a house admirably planned and adapted for the work, and situated in the midst of a district populated by the very poor, many of whom are of Italian birth. Our visitor, an Italian, says the people are very poor, their tenements dark and very dirty. Happily, in this new schoolhouse to which they are coming, there is a flood of sunlight to greet them and on each floor, the much needed lavatory, and in the basement, a fine bathroom with an adjoining dressing-room.

We have now what we have long wished for—a big, bright room for carpentry, forge-work and cobbling, and an equally pleasant and well-appointed room for truants, who are taught in addition to these industries, weaving basketry, whittling, drawing, color and pyrography.

Although the building is still in the hands of the workmen, we manage to care for 216 children daily.

The cobbling, introduced last term, is a most practical and useful occupation that may be carried on by the boy in his home at a small outlay for tools and material.

Mr. Arthur Curtis James' most generous gift started this and the carpentry industry, and the additions made by Mrs. R. H. Derby and Mrs. A. Newbold Morris helped to carry out the work to the end of the spring term, but funds are now needed and we earnestly hope some one convinced of the utility of this cobbling branch will come to our aid this fall.

The receipts for articles made and sold by the truant class since its inception in 1897, amount to $677.74, a tangible proof of the efficiency and practical value of this work; the moral value to the

BOYS HAYING AT THE FARM SCHOOL.

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boy who expressed in broken English by a father who said of his boy of twelve years, "Only one year with a clean record in my boy's life and that year spent in your Manual Training Class. When my boy came to this school it was his last chance; he had been discharged from every school in the district, he was a member of a gang of boys who lived in a car down on the flats by the railroad; he used bad language, played craps, and went with the gang to cut lead pipes. I was going to put him away, but heard of this school and so brought him here as a last hope, and he has never missed a day! Such a change! He has loved his work; his mother couldn't get him to stay at home one day for he said he might miss something."

Great tears rolled down this father's face as he added, "This school has saved my boy, and I hope now he will turn out a good man."

An Italian mother, whose boy was added to the class a year ago says, "Such a nice boy he is now, my Michael! Such a bad boy he used to be! Oh, he has stayed here one year now and been home every night!"

Another mother says, "That boy of mine, he was in such bad company. He used to go with boys who stole and pick pockets. I don't know that my boy did this but the boy he went with did it, and I was afraid every day he would do something to get arrested, but that is all changed now. He is such a nice boy—and my! the boy, he likes it, too! He never drink or stay out nights, and such a big boy, too. I am so glad he comes to this school and likes it."

The usual benevolences have been carried on by our deeply interested friends of the Board of Managers.

Cookery and the Thanksgiving dinner and the Mothers' Tea by Mrs. A. Newbold Morris, the gifts of shoes and the daily hot dinners, and a fund for the destitute by the Board of Managers; clothing from the Monday Sewing Class, through Mrs. Beverley Robinson, and from the Needlework Guild of America, through Miss Clarissa H. Livingston. The Christmas tree, with its load of toys, and the Christmas dinner of turkeys, mince pie and other goodies by the Board, and special dinners to needy families by Mrs. W. C. Schermerhorn and Mrs. W. Bayard Cutting, and a teacher for the classes in sewing by Miss Louisa Lee Schuyler and Miss Georgiana Schuyler. Gifts of clothing and towels have been received also from the Knickerbocker Sewing Club, through Mrs. O. Egerton Schmidt and Miss Josephene Stevens, from the Children's Fold, from Mrs. L. N. Bayliss, Mrs. Herman Vogel and Mrs. R. H. Derby. From Miss Pauline Robinson, Mrs. Endicott, and Mrs. S. A. Tucker, the toys and games to delight the little ones have been received this year, and the warm bedding, so welcome in the winter weather, from Mrs. Bache Emmet.

We hope to form this winter a Mothers' Club, the members to meet socially once a week at the school, and it is our earnest desire that friends will volunteer to meet these women and in familiar talk to instruct them in housekeeping affairs, sanitation, and kindred subjects, and also give them some amusement which they sadly need. Music is always delightful to these people and reading and recitation—in short, anything that will instruct, interest and amuse.

Our dear friend, Miss Sarah Schermerhorn, has left us for a better country. Our grief is deep, our loss grievous. Miss Schermerhorn was thoughtful for all connected with the work of the school and genial and encouraging in her intercourse with teacher and scholar. Her contributions, with those of Miss Eva V. C. Morris, Dr. Beverley Robinson, Miss Seward, Mr. Douglas

Robinson, Mrs. H. E. Howland and Miss Julia Livingston to the poor fund, have assisted many a sick man, woman and child. The Scott family is one of many families so assisted. The husband was long ill of consumption and utterly destitute. The neighboring dispensary supplied milk for the man, but the family lived for a time on food brought with these contributions, and the food left from the scholars' table.

In Miss Schermerhorn, the Manual Training Class has lost a most liberal and deeply interested friend.

The teacher of this class and the principal of the school are deeply indebted to Mrs. Ostrander and Miss Laura J. Edwards for information given in connection with rug and carpet weaving, basketry and rush work, and to Mrs. Douglas Robinson for large purchases and to Mrs. J. E. Hedden, Jr., for a gift of money with which to buy material.

The entire school was fitted out with new straw hats last spring by a friend of Miss Julia Livingston. The old, torn, soiled woolen hats and caps were gladly exchanged for the light, cool and prettily trimmed straw hats. Miss Livingston did not forget the candy treat after the examination.

Last Christmas a class teacher in one of the public schools of this city suggested to her class that they send an Xmas gift to our poor children. The scholars were charmed with the idea—one child told another—and soon the entire school was at work and the result was astonishing. Two barrels of the largest size were packed with great stockings filled with candy and fruit and in almost every stocking a little money was hidden in a little friendly note. Two large bags were packed to their capacity with cast-off but very good articles of clothing, and so many games and charming story books that we ceased counting them.

The delight of the child who discovered the pennies and the note hidden in the toe of his stocking will be easily understood by every one who loves little children.

The children were given the Easter prizes and a visit to the circus by Miss Eva V. C. Morris and Miss Clarissa H. Livingston, and, to encourage cleanliness in the elder scholars, Miss Josephine Stevens gave, at Easter, combs, tooth brushes, nail brushes and soap.

The farewell feast of ice cream was given the children on the day we vacated the old schoolhouse, by Miss Morris.

To all our friends who have contributed in any way to the success of our work, we are deeply grateful.

Respectfully submitted.

E. Haight,
Principal.

The Fifty-third Street Industrial School.

(In the Fogg lodging house, 552 West Fifty-third street. Erected in 1894, by bequest of Mrs. William H. Fogg, in memory of her husband.)

Miss Kate Crommelin, *Principal.*

Board of Managers.

Mrs. Frances McN. Bacon, *President.*
Mrs. George B. Moffat, *Vice-President.*
Mrs. Henry R. Kunhardt.
Miss Agnes Troup.
Mrs. George Mosle.
Mrs. George Nichols,
Miss Whaley,

Miss Dorothy Watson, *Secretary.*
Mrs. J. G. Croswell, *Treasurer.*
Mrs. J. Kennedy Tod.
Mrs. M. Allen Starr.
Mrs. Percival Knauth.
Mrs. William R. Warren.

Number of meals given from November to April	17,265
Number of baths given from November to April	2,077
Cooking class from November to April	39 lessons
Pay class in cooking from November to April	20 lessons
Carpentry class from November to April	39 lessons

The little girls love the cooking lessons and are very proud when the family at home praise the dishes they have learned to make in class. This year the boys, too, are very anxious to take cooking lessons, for in the families where the mothers are dead, and there are no sisters, it is very necessary that the boys should be good housekeepers and cooks.

In November, 1902, Miss Crommelin organized a mother's meeting, which is held once a month, and is a great success.

Talks, entertainment and refreshments are given and are greatly enjoyed and appreciated by the mothers.

DOROTHY WATSON,
Secretary.

DONATIONS BY BOARD OF LADIES IN WEST FIFTY-THIRD STREET SCHOOL.

Mrs. Kunhardt	$50 00
Mrs. Mosle	50 00
Mrs. Moffat	30 00
Mrs. J. K. Tod	75 00
Mr. J. K. Tod	25 00
Mrs. Warren	25 00
Mrs. Watson	25 00
Mrs. Knauth	25 00
Mrs. Bacon	35 00
Mrs. Clarence Whitman	25 00
Mrs. Hoar	25 00
Mrs. Albert Strauss	25 00
Mrs. Townsend	25 00

Mrs. Nichols	$25 00
Mrs. Humphreys	10 00
Miss Troup	75 00
Miss Whaley	25 00

We are more than indebted to the Board of Ladies for their never-failing interest in our children. Each month they bring to us new strength by the great interest they show in our work, and for the brightness they give at the Christmas time; in fact, each day tells of their goodness, as our children gather around the tables spread with their kindness.

I want to thank our good friends of the Central Presbyterian Church for their generous donation to the Christmas dinner; it gives such a wonderful Christmas cheer.

May I thank all our kind friends who have given us the power to brighten these little lives?

Children enrolled during year	762
Daily average attendance	410
Number in cooking classes	55
Number in woodwork class	16
Number of meals	34,529
Number of children bathed	3,815

Respectfully submitted.

KATE CROMMELIN,
Principal.

The Brearley League Industrial Evening School, 552 West Fifty-third Street.

Officers of the Brearley League, 1902-1903.

Louise G. Freeland, *President.*
Alice R. Clark, *Vice-President.*
Ethel N. Smith, *Recording Secretary.*
Gertrud Von Briesen, *Corresponding Secretary.*
Florence A. Bryant, *Treasurer.*

Evening School Committee.

Florence S. Sullivan, *Chairman.*	Frances Pell.
Elizabeth M. Hoffman, *Secretary*	Josephine Taber.
Kathleen Bulkley, *Treasurer.*	Constance F. Wheeler.
Margaret Beaman.	

The tenth year of our school work opened on a new basis; we must, therefore, consider it a year of experiment, and be doubly appreciative of its large measure of success.

The opening of many public evening schools, and the enforcing of the factory law demanding that a girl attend day school until her fifteenth year, did away with the requirements for our usual grade work, and made the development into an industrial school a necessity. In this work it was decided to no longer offer free instruction, and the plan to charge a nominal fee for admission to classes in order to encourage greater self-respect and an appreciation of privileges, met with the cooperation of our girls.

The school opened October 6th with the following programme: Three classes per week in cooking, one class in dressmaking, two classes in sewing (one elementary and one advanced), one in kitchen-gardening and one in domestic science. The fees varied from ten to twenty cents per month, according to the class work. In addition, three classes in calisthenics were offered each week, without extra fee, to those attending one or more of the paid classes. A free class in literature was very popular.

On Friday the clubs met as heretofore to enjoy a social evening, each club in turn entertaining the others.

Late in the winter an attractive room was furnished as a library, and the girls were given the privilege of drawing books three times each week. Magazines were provided for those who cared to spend a quiet evening in the well-lighted, cheerful room.

Seventy-seven of our girls were given the usual week's outing during the hot months. The summer school was again opened for July and August, and about eighty little hot and restless children were daily kept from the streets and amused by our teachers. Bread and milk was provided at noon.

Our teachers find that the factory work in which so many of our girls are employed, develops them in such a manner as to make them quite unlike the average school girl. New problems and unforeseen difficulties must be worked out to meet the individual needs, for a girl who has stood for ten hours at her loom cannot be taught by methods applied to day-school scholars. Thus each year brings new difficulties, but it also brings those blessed lessons of experience that help us to master the situation.

It may interest our friends to read some statistics relative to our work:

Number of garments made	151
Number of baths given	872
Money deposited in Penny Provident Fund	$258.53
Average register of school	131
Average age of scholars	15 years
General occupation	Factory work
Average wage of scholars 17 years and over	$6 per week
Average wage of scholars under 17 years	4 per week

FLORENCE S. SULLIVAN, *Chairman.*

Forty-fourth Street School, 247 East Forty-fourth Street, Corner of Second Avenue.

(In the Forty-fourth Street Lodging House.)

MISS BERTHA W. SCHLEGEL, *Principal.*

Board of Managers.

Miss Brace, *President.*
Miss Grace Potter, *Vice-President.*
Miss Aldrich, *Treasurer,* 120 East 34th street.
Miss A. M. Bogert, *Secretary,* 112 East 39th street.
Mrs. Van Boskerck,
Mrs. Temple Bowdoin,
Miss C. A. Beekman,
Mrs. J. Hooker Hammersley,
Mrs. C. H. Dodge,
Mrs. Charles D. Stickney,
Miss K. S. Jackson,
Miss Brush.

Annual Report of the Principal.

The work of the Forty-fourth Street School, displayed at the exhibit last spring, was highly praised and commented upon. Special mention was made of the excellent results obtained in the chair-caning class, which is supported by Mrs. Temple Bowdoin, and the class in Indian basketry. The teachers all worked with great devotion, and so aroused the children's interest that often the boys were at the school door long before their teacher's arrival, hoping to be permitted to put a finishing touch to some unfinished work of the previous day before school assembled. A row of chairs, lacking seats, brought from the children's own homes daily adorned the workroom. As fast as these were repaired others were brought in. Heartily do I thank our devoted friends, the ladies of our Board, for their inspiring, helpful visits to the school, and for unfailing interest and very generous aid in our efforts to make our school attractive and a means of bringing much good into the lives of the children under our care. The hot dinners, weekly baths and classes of sewing, cooking, basketry and ironwork, supported by the Board of Ladies, are untold blessings.

The industrial branches taught have had a splendid influence for good upon the children and indirectly upon their parents. Parents who learn that their daughters can cook and do plain sewing, and that their sons can actually cane a chair, weave a basket or make a beautiful article of Venetian ironwork, find a new interest in their own work, and respect the knowledge their children have gained. "I wouldn't believe it when he tole me," said one delighted father, who had come all the way to school to see a chair which his son, Willie L., had caned. "I didn't know dat feller was so smart! I had to see dat chair with my eyes first."

Formerly a truant, now a record of *perfect attendance* and *excellent work,* manual training was Willie's salvation, as it has been of many other boys. Willie is the oldest of eight children. Soon he will have to assist in supporting the family. We know that he will do his part well.

One of the roughest of our boys in the basketry class said; "Last term I couldn't git dis work troo my head, and now how nice I do it, huh, teacher!" It is this pride in doing a thing well that tells the story. The secret lay in this boy's having been taught to love his work, finding his happiness inside the school instead of on the streets as heretofore.

An amusing incident was that of a little street urchin who, upon being caught by the truant officer, gave our school as the school which he had attended. Upon reaching the classroom the teacher was asked the boy's record at school. "He is not our child," said Miss W—, "but we will be very glad to keep him." The officer turned upon the boy and again asked where he had attended school. "Here!" said the boy. "Who was your teacher?" "She was," said Oliver, pointing a grimy finger at the astonished teacher. This was too much for both teacher and officer, and the school register was searched but, of course, his name was not found upon it. "At which desk did you sit?" was next asked. Oliver promptly pointed out a desk in the room. Nothing could shake his story. Finally the vexed official placed the boy into the seat with emphasis. "Very well, sit there then," said he, "and don't you have that place vacant a day!" And Oliver is ours, present every day and seemingly a most contented child. A member of a gang of small boys, he had noticed that one after another of the gang had drifted to our school and he thought this must be a place of sanctuary, and he placed himself at our mercy.

One of the mothers who was visited said: "Please you keepa my boy in your school. No play in de street. He lerna good work here. When he maka a man, he erna much mon. Not little mon like his fader!"

The children have grown more ambitious. The Italian-American of the future will not be satisfied with the keeping of a fruit-stand or bootblack's chair as a means of making a living. A spirit of manliness and self-reliance has been awakened, and it is our great aim to cultivate this spirit. Several years ago I received a letter from one who signed himself "*Jimmy,*" a former pupil of one of our schools. The letter expressed deep gratitude for what had been done for the writer by the Children's Aid Society, and enclosed ten new one dollar bills. Since then he has a number of times sent money for a special treat, always mentioning that it is a token of love and appreciation. In December came money for a special ice cream treat for the highest class and a letter which said: "Please say to the children that I was once a poor little streetsweeper. With the pennies I received I tried to supply the wants of a sick mother. Your Superintendent, Mr. Dupuy, found me and upon hearing my story provided food and other relief. I was placed in a school, and when my poor mother's death left me homeless and alone in the world, your kind Superintendent found for me shelter and food. I have never ceased to love him for this." Through the knowledge that "Jimmy" gained in the Children's Aid Society school, and the kind interest of his new friends, he was able to secure and fill a responsible position which he now holds. I have never seen "Jimmy," but I know that he is an appreciative and noble man.

Last week a former pupil called to see me, dressed as a messenger boy. He had been recently promoted to public school and I thought he was still attending there. Poor Pasquale! He had a sad story to tell. "My mother is dying, Miss Schlegel," he said, "so I went and got me a job. We have two new babies and Rocco can't earn enough for us all. We are so many now. (Rocco, a former pupil is aged fifteen years; Pasquale fourteen years.) My father hasn't been home in a good many weeks. We must earn the money now." I visited the family and found the poor, deserted mother sitting up, holding a sick baby in her arms. The other baby was lying on the bed. Katie, aged five years, and Agnes, aged two, were lying about the room. Katie was taking care of her mother. The twins were just one week old. Mrs. P. had had no medical care whatever during her illness. A kind-hearted neighbor had given her assistance, but the shock of her experience with the sick woman prostrated her and she is now herself ill. Mrs. P. expressed grateful thanks for what had been done for her and her children at school. "Rocco so good now, and Pasquale too. They used to be very bad boys. The school made them good." It was very true. Two quite impossible cases these boys seemed, but patience, love and interest in their doings won the day, and already they have shown that they have much that is noble in their characters.

In another home visited we found the mother and a new-born baby occupying the only bed. There were no sheets or blankets—just a few old clothes for covering. Four children slept huddled together upon a bundle of rags on the floor of a dark bedroom. This was in December. Blankets and other relief sent from the school gave unknown comfort. In another home a fifteen-year-old girl, Mary T—, has been the sole housekeeper of the home for several months. The family consists of father, mother, four children. In June the mother became suddenly insane, and tried to jump from the top floor window of the tenement which is their home. She was placed in an asylum. Mary took care of the home and all was so well done—cooking, washing, ironing, mending—for five persons! Her mother could not sew and was a poor cook, so Mary had to learn all at school. In a letter to me she says: "Poor mama's mind is very bad. She has spells. She loved us when she was well, but she don't want us near her now, even papa. The children cry for mama all the time. It is so hard, but what can we do? We must take it as God sends it! Papa says how lucky it is that I learned to cook, sew, and to do so many other things at school, for now we can keep up our home."

Think of it! Children of fourteen and fifteen years of age the bread-winners of families of six and eight persons! Is it not terribly sad? And does it not prove the blessedness of our work, when children of such tender years can assume such responsibilities through knowledge gained at school? Our loving welcome is ever ready, and we do all we can to make their lives useful and happy, but often children cannot attend school for lack of shoes. These needs we wish to supply, but the demand is often very great and our funds not equal to the demand. Aid in this direction will be most gratefully received.

The Thanksgiving dinner given by Miss Mary M. Billings was greatly enjoyed, our one regret being that the kind donor was unable to be present. The party given by Mrs. Wm. Reynolds Brown at White Plains to twenty-five of our boys, and the Christmas tree party given by Mr. and Mrs. Lewis Cass Ledyard were most delightful treats. The Christmas festival given by our Board of Ladies was a splendid success. The children received beautiful gifts of dresses, boy's shirt waists, toys, and, oh, the joy of it, each girl a daintily dressed doll! That our little girls might have dolls has been my heart's wish for some years, but the good, warm clothing was far more necessary, and we had not funds enough for both. Mrs. Temple Bowdoin's loving thoughtfulness provided the dolls. After the presents had been distributed a "trick man" sent us by our good friend Mr. Bogert, gave the children a merry hour.

Mrs. George Cabot Ward does not forget the children. We are grateful to her for the pretty dresses and flannel shirts provided at Christmas, and for the treat of cakes on Washington's Birthday. To Mr. J. R. T. McCarroll and the Bethel Presbyterian Sunday School at East Orange, N. J., we extend sincere thanks for the splendid case of gifts at Christmas. To all other friends who have aided us in any way we give best thanks, and we hope for a continuance of their interest.

Children enrolled during the year	502
Average attendance	284
Average attendance of kindergarten	110
Basketry class	12
Chair-caning	12
Venetian ironwork	12
Cooking	12
Sewing	56
Hot dinners served	33,491
Sent to public school	76

Respectfully submitted,

BERTHA MARIE SCHLEGEL, *Principal.*

CLASSES FOR CRIPPLED CHILDREN.

Avenue B and Phelps Schools.

Auxiliary Board of Managers.

Miss Mabel Irving Jones, *President.*
Miss Sofie Shippen, *Vice-President.*
Miss Mary R. Cross, *Treasurer,* 6 Washington Square.
Mrs. D. Carroll Harvey, *Secretary.*
Miss Josephine Beeckman,
Miss E. B. Higginson,
Mrs. Hilborne Roosevelt,
Miss M. Schott,
Miss Emily Cross, *Chairman Educational Committee.*
Miss E. D. Littell,
Mrs. Howard Van Senderin,
Mrs. F. A. Stokes, *Chairman Relief Committee.*
Miss Marie Baldwin,
Miss Bliss,
Miss Eleanor Erving,
Mrs. D. A. Pearson,
Miss Marian Hague, *Chairman Girls' Trade Department Committee.*
Miss Katherine Day,
Mrs. Walton Duane,
Mrs. W. N. Duane,
Mrs. H. A. Taylor.

Teachers Avenue B School.

Miss Van de Ventner,
Miss Mockridge,
Mrs. Spalding, *City History.* (Services donated by History Club.)
Miss Curtis, *Embroidery.* (Services donated by Mrs. R. M. Hunt.)
Mrs. Graham, *Superintendent of Girls' Trade Department.*

Phelps School.

Miss True,
Miss Grass,
Mrs. Crawford, *Trained Nurse for both schools.*

The past year has been one of great progress in the classes for crippled children in both the Avenue B and Phelps Schools. In the latter school the number of children belonging to the class was twice that of the previous year and the class for cripples in the Phelps School was only started in January, 1902.

The Girls' Trade Department, run in connection with the Class for Cripples in the Avenue B School, has proved very successful.

This department is for the purpose of teaching the older girls some trade by which they will be able to earn a living, and is supported by the Auxiliary Board of Managers.

The girls are much more proficient in fine needlework and in the making of lamps, candle and electric-light shades and take a greater interest in their work.

The classes were closed early in the spring, for a house in the country was offered for the use of the children, and 70 of them were sent, under the care of a trained nurse, to enjoy a little country life, which was of great benefit to them.

NOTE.—The Treasurer's Statement and List of Contributions will be given in the Special Report of the Classes, which is to be issued later.

ELIZABETH J. HARVEY,
Secretary.

The Rhinelander School, No. 350 East Eighty-eighth Street.

(Erected in 1890 by the Misses Rhinelander.)

Crippled Children.

While the problem of self-support has not yet been satisfactorily solved, yet we have discovered ability in certain branches among some of our cripples that lead us to believe that such ability may be turned to practical use.

So many sad stories come to our notice. One little one belonged to a widow, whose only means of support was washing; when brought to what she called her home, she was placed on a table near a window, there to await her mother's return from her daily employment. A sad home coming to that poor mother, in one way, yet, as she often said: "The sight of that sad and patient little figure gives me strength to fight the battle of life."

Another touching incident is that of a boy whose mind is affected and who has been in an institution for several years. Although his mother is a janitress yet, she has always grieved to think that her boy was not home. One day she was told that there was now a school where her boy could stay all day and be taught and receive care and attention, and yet he could be home with her at night, and without waiting to properly protect herself from the winter's cold, she hastened to the school to plead her case and beg admittance for her boy. He is now one of the happiest boys in our school and is beginning to show signs of a mental awakening.

Another little boy, whose limbs are partially paralyzed, has developed a great love for sewing and embroidery. Having no mother to care for him or guide him, he stays with us until the last trip made by the wagonette and spends his leisure hours making " a little bag for papa's slippers " or " a little embroidered piece for papa's table."

We feel particularly encouraged in our work among our defective children; we have found only one totally hopeless child. Many that appeared to us at first almost idiotic, have, by kind and patient training, shown considerable mental and moral improvement; by improving the morals of these unfortunate beings we feel we are accomplishing a work not only beneficial to the child, but to the entire world. Too much cannot be said on the subject of moral training among this particular class of children, many of whom would not now be so sadly afflicted had they received moral training at home.

The following letter, written by the mother of a boy we just admitted into our class for mentally defective children, is but one instance of gratitude expressed by parents:

"Oct. 16, 1903.

"Dear Friend:

"Miss Stackpole i thank you very much for your Kindness in takening my boy C——— in if you did not take him his Farther was going to send him far away to Syracuse and that would brake my poor heart may god bless you for your Kindness to my boy may he be able to learn more than ever before i am happy when my child can be coming home every day to me

"From yours
"Friend
"Mrs. C———."

For the past year our cripples have enjoyed a drive through Central park once a week, each teacher accompanying her class and explaining to them all points of interest and taking this opportunity to teach Nature. Should any one like to see a picture of happiness, let him be at our school as these little ones are getting ready for their weekly drive; physical and mental deformities and repulsive faces are forgotten, and only the pinched little features brightened up with happiness are remembered.

For the means to support this noble charity we are indebted to Miss E. Watson. To her these poor little ones owe their happiness at Xmas; clothing, toys, etc., were generously given by her and nothing was spared to bring sunshine into these dark little lives.

Through the Tribune Sunshine Society our little ones were the recipients of several pretty and useful gifts. Mrs. Hayes' little band of mission workers in New Haven have brought much sunshine to our little ones. Our cripples sent specimens of their work to a school for Indian children in the West and received in turn, specimens of their work which afforded our children instruction as well as pleasure.

To Mrs. W. Bayard Cutting we are indebted for a gift of money to be sent us annually and to Mr. W. Bayard Cutting we are indebted for his generous Xmas donation. We also owe gratitude to Miss Dyer, Mrs. Andrews, Miss Lilianthal, Miss Dorothy Steele, Mr. Huyler and Needlework Guild for their generous contributions. To Mrs. J. Allebone we are particularly indebted for her endless deeds of charity; to make our little cripples happy is her aim in life, in which she has proven most successful.

Respectfully submitted.

K. REA STACKPOLE,
Principal.

Henrietta Industrial School, No. 225 West Sixty-third Street, Near Eleventh Avenue.

(Established by a Friend in Minnesota and by Messrs. A. BLAIR THAW and D. WILLIS JAMES.)

Annual Report of the Principal.

Last winter was unusually hard for every one, owing to the high price of coal, and many of our families were in a sad condition. Our children come from homes which are often destitute of the bare necessities of life. The strikes have much to do with the poverty and wretchedness of these homes. The laborer is poorly paid, and when out of work or when sickness comes, nothing has been saved, so there are no resources to fall back upon. The father often gets discouraged and drowns his care in drink, which means so much more suffering for the family.

The father of one of our most worthy families was taken ill and sent to the hospital. The mother, a delicate woman and janitress of the house, worked very hard and was taken ill. Two boys and a girl attended school. The boys were often late and frequently absent in the morning or afternoon. When visiting the family we found that the boys, aged ten and twelve, not only nursed their mother, but did the washing, scrubbed the stairs and halls on Saturdays, and every day dressed their little sister and sent her to school. It was a pleasure to be able to help this family. I well remember the day when Andrew came to tell me his mother was able to walk. He said: "She went out with me to-day, and leaned on my arm."

It is through the kindly interest of Dr. and Mrs. Thaw and Mrs. G. G. Wheelock that we are able to help many of the worthy poor. Mrs. E. T. Gerry's Christmas appropriation is a great blessing. The money is used chiefly for shoes, clothing and food.

Our Truant and Carpentry Classes are supported through the benevolence of Miss Bruce. We have a fine class in carpentry. The boys are greatly interested and their work is a credit to their teacher. We are grateful to Mr. W. C. Osborn and Dr. and Mrs. A. Blair Thaw for their support of the class in cookery. This feature of our work is a great help to our girls and they are eager to join the class. Dr. and Mrs. A. Blair Thaw provide for the warm dinners, which mean so much to our children, many of whom do not have any other wholesome meal.

Our little ones enjoyed their usual Christmas dinner and tree through the generosity of our friends, Mr. A. B. Hepburn, Mrs. A. Carnegie, Mrs. Henry Potter, Mrs. G. G. Wheelock, Mrs. L. M. Holt, Mrs. J. P. Morgan, Mr. G. C. Smith, Mrs. H. F. Webster, and Dr. and Mrs. A. Blair Thaw. Mrs. Thaw's little daughter made a special donation of toys to the kindergarten class.

Through the generosity of Mr. G. C. Smith, The West End Collegiate Guild, Mrs. Potter, Mrs. Moore and Mrs. Webster, a number of our boys enjoyed two weeks at the Boys' Camp.

We are grateful to all of the kind friends who have helped and encouraged us in our work.

Children enrolled during the year	976
Daily average attendance	454
Class for cripples	52

Respectfully submitted,
EMMA O. MEEKER,
Principal.

Crippled Children's Classes in the Henrietta School.

(Supported in part by Miss Spence's School Society.)

Officers.

MISS AMY ELLIS, *President.* MISS NATALIE MUNDÉ, *Vice-Pres.*
MISS DOROTHEA DRAPER, *Sec.* MISS ALICE AGNEW, *Treasurer.*

Directors.

MISS ANITA PEABODY, MISS CATHERINE DODGE,
MRS. W. F. DOMINICK.

The second year of the class for crippled children under the management of Miss Spence's School Society, has been interesting, and, on the whole, full of encouragement. About fifty-two children remained on the roll during the year, and the average attendance was good. In spite of their disabilities, the children are always cheerful and most appreciative of the school and the hot dinners. During the year, under the guidance of a very efficient trained nurse, the appearance of the little ones improved decidedly, children and mothers cooperating with the nurse in her efforts to teach them cleanliness, and to impress upon them the importance of attending the clinics and hospitals regularly. Physical improvement has been marked in several cases.

The fortnightly meetings for the mothers were most encouraging, the women coming together to sew, chat and drink a social cup of tea.

And this year, owing to our enlarged rooms, a sewing and trade class for the older girls has been successfully started.

Through the kindness of a friend, the loan of an old farmhouse at St. James, L. I., was secured rent free for July, August and the first part of September. Sufficient money was finally raised to keep thirty children there during this time, under the care of the trained nurse and an assistant. In a few special cases the child was kept for the entire ten weeks. But the majority went for a fortnight at a time, the house being only large enough to accommodate ten children at once.

Thus in spite of some discouragements, we cannot but feel that much happiness has been given to these little cripples, and that our efforts to educate and train them to some degree of usefulness will not be without results.

AMY ELLIS,
President.

Italian School, 156 Leonard Street.

(Erected in 1874 by the Messrs. Fabbri and others.)

Not only do we assist the children but visit them at their homes in order to obtain a closer insight into their domestic life, and many are the words of encouragement and counsel given to the parents by the teachers who strive to make the child a connecting link between the home and the school, knowing that if they gain the confidence of the child the stronger influence will they have upon the parent, as in the following case. A little girl who was kept at home for some time, owing to the illness of her mother, wrote the following note to her teacher, which is given in the child's own words:

Dear Mrs. M——:

I write you and tell you that my mother is sick and that is why I am late every morning, you know the work my mother is got to do. I have to do it because she is sick. She wants me to leave school because my father does not work. She says she is sorry for me to leave school, but she is so sick she maybe will not be better so I must help a little.

Giloema *C*——.

The ambition and desire of many of our Italian parents is to have their children taught to read and write letters to their friends, for so little education have they that many of them are unable to read in Italian or even write their own names, and realizing their own lack of knowledge are desirous of giving their children advantages which were denied them.

Owing to the crowded condition of the public schools we have some difficulty in placing our promotions. We endeavor to keep in touch with our graduates, and to know which school they attend.

A medical inspector visits the school every morning, and in connection with the treatment given by the nurse we are able to alleviate and cure many cases of sickness which otherwise might prove serious.

During the past year we lost by death our generous patron, Mrs. Egisto Fabbri, who for so many years provided hot dinners for the children. We sincerely hope that her " mantle " has fallen on those who will continue this greatly needed charity.

Thanks are due to Mrs. Morgan for her thoughtfulness in providing the Christmas dolls for our girls, as she has done for many years.

Mr. Morosini donated a generous amount to help make our Christmas entertainment a fairy land to our little ones. He also donated a sum of money to the drum corps of the school which was much appreciated by the boys. And to all others who had a kind thought for their less fortunate fellow-beings we offer our grateful acknowledgments with the earnest prayer that our friends will not become "wearied in well-doing."

Children enrolled during year	982
On register October 1st	538
Daily average attendance	505
Average attendance in kindergarten	117
Number of meals supplied	19,155
Children sent to public school	141

Respectfully submitted,
Eleanor E. Staats,
Principal.

Italian Evening School, 156 Leonard Street.

Let me ask our good friends to join me in a visit to the places of business of the men who were once boys in our school. Let us see what our work has done for them. Here are machinists, printers, editors, doctors, teachers, grocers and others, all doing well, and all ready to freely acknowledge the assistance received from the Children's Aid Society in their early years; the instruction in English, and the common school branches of study gave them a firm foundation upon which to build up their business possibilities, until time and experience brought success.

One young man who is now in the Normal University, taking a course of training with the idea in view of becoming a teacher, writes me as follows: "When I look back to those dark days in my life before I came under the influence of the teachers in the Italian school, and compare them with the later and better days when my teachers had taught me to look higher than I had ever

CRIPPLED CHILDREN AT THE HENRIETTA INDUSTRIAL SCHOOL.

done before, and to abandon the old life for one of purer, nobler aspect, I feel as if I could never be thankful enough for all they did for me, and I want to do all I can to help my countrymen to a better way of living as a slight return for the blessing I have received." Thus we see the result of our labors. The seed planted so many years ago is bearing good fruit, and we rejoice accordingly.

Many of these boys and young men came to us upon their first arrival in this country. Strangers in a strange land. So grateful and deeply appreciative are they all of the good received by them through the schools of the Children's Aid Society, that they are now working earnestly, and with the firm determination to establish another Italian school under the care of the Children's Aid Society, for the children of "Little Italy" in Harlem.

Come with me to the homes of those newly arrived here. Now we find ourselves in the midst of the rag-pickers. For many new arrivals find this the only business they can engage in at first.

The rooms are small; the family usually large; every available spot is piled high with filthy rags and papers. These are sorted and baled and removed to make room for other piles. The family sleeps and eats amidst this litter, and knows no other home than these ill-smelling and dirty rooms.

Our next call will be upon the sweat-shop workers, equally as miserable as the last mentioned, but a little less wretched in their surroundings it may be. Here the piles are of clothing, new, and therefore clean. The rooms are small and ill-ventilated, however. The entire family is busy at work. Children of six are pulling out bastings, others a year or two older are sewing on buttons. All these children we must rescue—the rag-pickers' little ones and those who strain eyes and backs working at trousers and coat-making. Our school must get these children into its rooms, where fresh air and proper food and clothing are by no means the least of what we must provide for them.

Once more we will start out upon a visit, this time to see what becomes of the young girls who work all day in factories. What are their homes like? Can they find there the recreation, the little pleasure they long for, after the hard day's work is done? Hardly. The rooms are like all the others we have visited, in that they are small and crowded with people. The father and mother are there, and the many sisters and brothers, and probably several boarders as well. There is no place to sit down to read, no inducement to engage in any pleasant occupation. The young girl grows restless and is eager to get out into the street where there are attractions of many kinds. She must be guided and helped, or she will go astray, through her very natural desire for recreation and a good time. We will invite her to our school, where bright, cheerful classrooms and pleasant and congenial occupations will give her the change she needs. She comes gladly and stays willingly, and leaves us when she must with great reluctance. I am reminded of one restless girl whose nervous activity found vent in many little deeds not really bad, but requiring the attention of her teacher, who frequently found it necessary to detain her after school for a quiet, confidential talk. At length the teacher asked the girl one day why she continually broke her promises to do better; why she compelled her teacher to keep her after school so often. The girl broke down and said, "I know you think I am a very bad girl, I do not mean to be, but when I do anything wrong and you keep me in, you always put your arms around me and pet me, and tell me you love me, and sometimes you kiss me. I want to be loved; I want to be kissed, no one else loves me or kisses me. I do naughty things just because I know you will tell me you love me; no one else is so kind to me as you are." When asked if her mother did not love her, she shrugged her shoulders and said, "perhaps so, I don't know; she has no time to tell me so; if she does, she never puts her arms around me; she pushes me aside if I go near her; she must work hard all the time." And so this starving little soul was led into misconduct simply that she might be fed with the love her heart so craved.

If a girl has been forced to go to work very early in life, as many have been, we place her in a grade class where her knowledge of reading and writing will be increased. If she has already been able to acquire a sufficient knowledge of the common school studies to answer her needs in life, we instruct her in dressmaking, millinery and cooking, with lessons in hand and machine sewing and embroidery and crocheting also.

We do not neglect the needs of the boys, who, like their sisters, seek amusement outside the place called home, after their day's work is done. Our boys have lessons in Venetian iron work and basketry, and enjoy it all immensely.

While we have been visiting together, we have noted the need of other branches of industrial training which would be of great benefit to our children. One particular branch is cobbling. I wish to enter an earnest plea for a class in this very important trade to our poor people. Many are the shoes that are worn out, and many are the hard-earned pennies that must be spent for mending the shoes that cannot be replaced by new ones. If we could find some interested friend willing to support a class in cobbling, the result would amply repay him for his generosity.

Money could be saved, and money earned by those able to mend the shoes of his family or neighbors.

We will now enter the school building and see for ourselves what is being done for the welfare of the poor and needy ones of the Five Points. Not only do the younger boys and girls attend these classes, but the older men, who are willing to stand in the crowded classrooms an entire evening, when all seats are taken, in order to gain a sufficient knowledge of English to aid them in their daily work of bread winning. For these eager students, we have teachers who are able to translate for them all English words into Italian, that they may more readily comprehend their meaning. It is a method of great value and of most satisfactory results.

We are greatly indebted to the Italian Government for providing means for instruction in the pure Italian language for those unfamiliar with it. The Italian language class is always well attended, and the lessons prove of especial interest and value to those who before attending it are obliged to pay professional letter-writers from 10 to 25 cents to write or read letters for them.

Our girls who work through the day, and who have outgrown the graded classes, are eager to join the sewing or cooking classes, where they are trained to prepare wholesome and palatable food for the family at home at a minimum cost of materials. The next room contains a group of busy, interested girls, some at work at machines, others hemming or seaming by hand. While as a relief from this less attractive work, we find others engaged in embroidery, crocheting or darning lace. At frequent intervals during the season, they are given dances, teas or musical entertainments, and this brings to our view the social side of school life here.

The boys and girls who have these pleasant affairs to look forward to are less likely to go to dance halls or other questionable resorts. Teachers always supervise these social meetings. Lessons in deportment are quietly given wherever needed, and little fault can be found with the conduct of boys and girls who attend. Sometimes it is a dance, a masque dance, or apron and necktie party. Again it is a tea, given by the girls of the cooking class to mothers and friends or to the club boys. The great event of the season is the musical entertainment of the spring, when a cantata is sung and acted by the boys and girls, and the hall is thronged with their relatives and friends, who enjoy to the utmost all that is offered to them at this time.

The older boys have a well-appointed gymnasium, and spend many happy hours exercising here. We have this past season inaugurated a smoking-room, quite an innovation in school life, but it has proved of much importance. It was found that the larger boys were many of them already smokers, and they would stay on the street or go to saloons for the sake of a smoke. Some there were who would try a surreptitious smoke in the dressing-room of the gymnasium, and when in danger of being detected by the principal or the person in charge of the gymnasium would try to hide or throw away their half smoked cigarette, thus running a great risk of setting the building on fire. Since the smoking-room has been established, the boys sit there comfortably, reading papers, playing games of checkers or dominoes, and contentedly smoking pipes, with evident enjoyment of the privilege accorded them. It has been possible for the principal to talk with these boys on the subject of smoking, and much good has undoubtedly been done by breaking up the cigarette habit among them. Since they *will* smoke somewhere, let them do so here where we can reach them with good advice and keep them within bounds.

It is needless to say that all this great work of our requires ample means to carry it on, and our fear is that we will be compelled to give up much of it unless we can receive necessary assistance from persons able and willing to aid us. The expense of classes in sewing, dressmaking, millinery, Venetian iron, basketry, etc., etc., are very great; without materials, no work can be done.

The Tribune Sunshine Society has earned our grateful thanks by many welcome gifts of fresh flowers, books, games, pictures, etc.

Our friend, Mrs. Walton, of Muscatine, Iowa, has remembered us with gifts of small sums of money to buy comforts for our most needy or sick families, also she has sent letters full of help and encouragement which have cheered us on our way.

Thanks are due to Mrs. Mangano, who so kindly brought to the school one night last fall a party of musical friends who entertained us for an hour or more with vocal and instrumental music, which was enthusiastically received by the boys and girls, who were assembled for the occasion.

A Thanksgiving dinner was provided for the girls of the cooking class by the rector of St. Agnes chapel, and they enjoyed to the fullest this delightful treat.

Number of children enrolled	1,085
Average attendance	338
Cooking class	15
Sewing class	25
Dressmaking class	15

Respectfully submitted.

LOUISE E. WEYGANDT,
Principal.

East Side School, No. 287 East Broadway.

(Erected in 1880 by Miss Catherine L. Wolfe.)

We had a number of Mother's meetings during the year, which we made a social feature, bringing us in close touch with the mothers, and when at all possible, giving them the help and advice needed. All help given received its equivalent in work, making them self-respecting. Only after a thorough investigation is help given. Three hundred and twenty-five visits were made by the visitor during the year. We were compelled in a number of cases, to send food, clothing, medical aid, and a nurse to care for the children, until mother or father had recovered sufficiently to work.

A family, where the father was a drunkard, and abused the family, the mother worked at school, until ill-health prevented. In that case we paid the rent, until she was strong enough to work. She was compelled to have her husband arrested, as he did not provide in any way for his family, and at one time almost killed the oldest boy.

In another case, the mother had been deserted, the little girls worked after school, and in that way, earned their clothing and shoes. During the mother's illness we paid the rent. We are called upon constantly to assist some case, and do it immediately, as far as the means at our disposal permit. One very kind friend provided coal for a very large number of families last winter. Without this help great suffering would have been the result.

Hot dinners, twice a week, with milk on the other days of the week, are provided by Mr. Steward. The mothers work, and the children would have to go dinnerless without our provision for them. This ever thoughtful friend also provided a Thanksgiving and Christmas treat for our children.

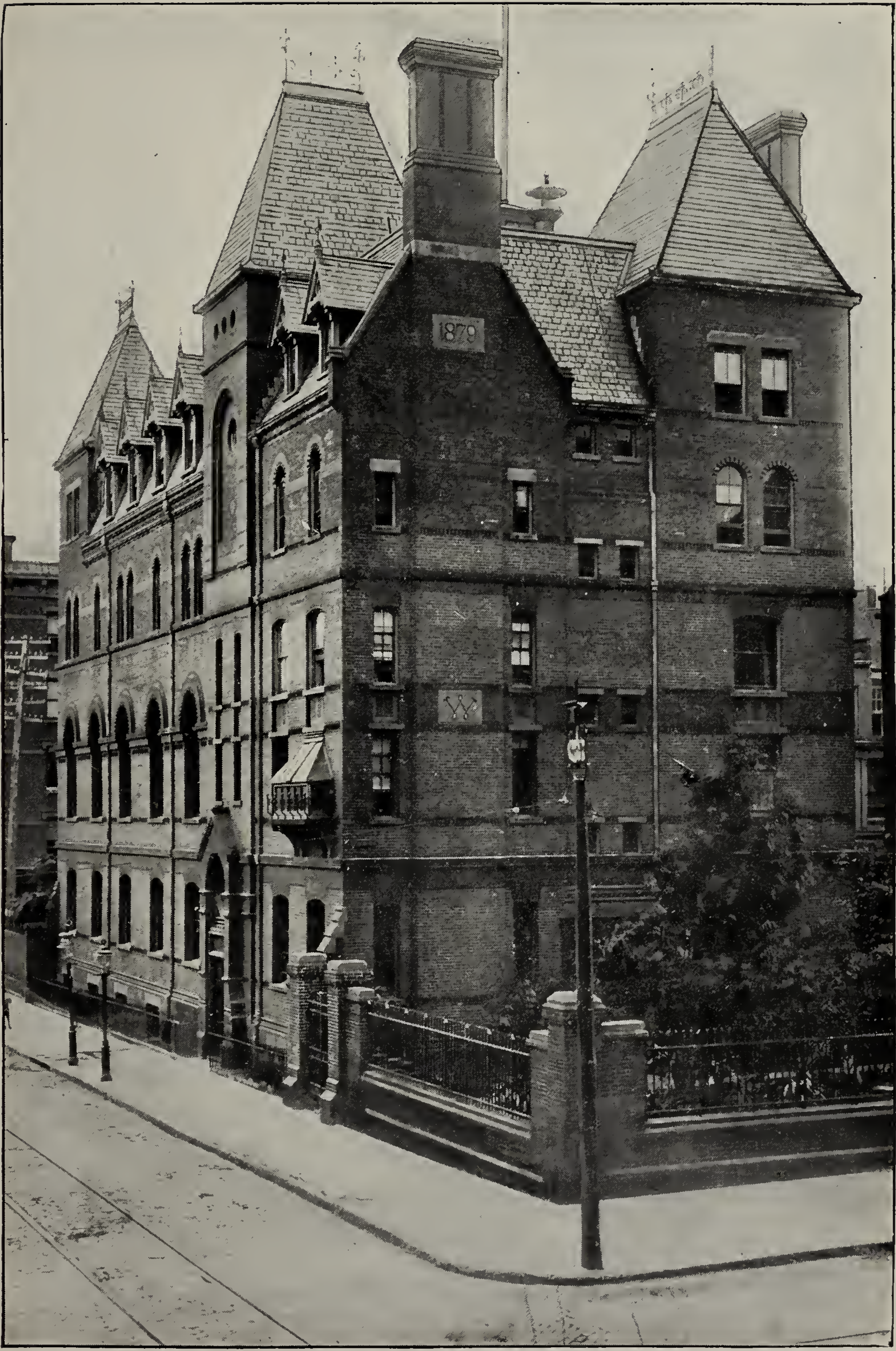
Our truant class, known as the steward class, accomplished a great deal of work last year. They are especially adept in manual work. They celebrated their Steward Day with a visit to the circus. On that occasion they wore their new uniforms, with a great deal of pride. The boys are still very faithful in their care of the conservatory. All plants donated will be well tended and thankfully received. Forty were admitted to the class during the year, seventeen are still on the register, eight are working, four were sent to institutions, eleven went to Public School. Our aim is to advance the boy two or three grades, and return him to public school, if the parent can afford to educate him, if not, we keep the boys until they are old enough to get their working papers. At one time this year out of a class of eighteen, fourteen had previously been arrested on some charge, principally stealing.

A class in cobbling was a great help, as the boys repaired the shoes, which needed repairing, so that many pairs lasted a few weeks longer. That we found a great help. One boy now has a position in a shoe shop and receives $2.50 a week.

Carpentry under a special instructor, enabled the boys to turn out some very nice pieces of useful furniture.

A class in machine sewing helped the girls to take positions in factories. One very kind friend makes room in his factory for our girls as soon as they are old enough to work. Instruction in sewing, darning, buttonhole making is given. Basket weaving and Venetian iron work were taught. Colonel Kenyon drills the boys one afternoon a week; and one evening of the week he meets the graduates.

Most heartily we thank the following kind patrons: Mrs. R. T. Auchmunty, Mrs. J. Sinclaire Armstrong, Mrs. W. Bayard Cut-



EAST SIDE INDUSTRIAL SCHOOL.
(Erected in 1880 by Miss Catherine L. Wolfe.)

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ting, Mrs. Elbridge T. Gerry, Miss Laura J. Edwards, Mr. Cyrus J. Lawrence, Mr. William Mitchell, Mr. Jacob H. Schiff, Mr. and Mrs. John Steward, Miss Mary M. White, and the Misses Wilson.

Children enrolled	1,064
Average attendance during the year	587
On register October 1, 1903	672
In the kindergarten	119
In the sewing classes	150
In whittling classes	24
In ironwork	24
In carpentry class	12
In cooking class	36
In cobbling class	24
In basket work	12
Children sent to public school	316

Respectfully submitted,

ALICE M. HILL,

Principal.

The German Industrial School, No. 272 Second Street.

(Established in 1859 by Messrs. O. OTTENDORFER, WM. AUFERMANN, JULIUS HESS, LOUIS WINDMULLER and others.)

Annual Report of the Principal.

Our school is composed of German, Austrian, Russian, Hungarian, Italian, Bohemian, and Roumanian children, and eighty-eight per cent are Hebrews. It is surprising to see how little some of these foreign people know about taking care of their children. Last week we found a little girl in a wet dress. She told us she had washed it that morning, and having no "other dress," had put it on and come to school. It was a cool morning; she had only one thin garment under her dress. I fitted her with nice warm outing-flannel underclothing and a dress. She is thin and stoops badly. She says she never went to school in Russia, but worked at beads. Our visiting doctor advised us to take her to Dr. Sayer, at Bellevue, to correct her deformities. He said she must have had some terrible sickness that left her in this condition. She said, "Yes, I was sick six months that I no walk and no talk." We are hoping for the best for her and that her mother will take better care of her. A great many children are brought to us before they learn to speak English. To such individual attention is given. They soon learn to speak and read and are passed on to the public schools.

It is almost incredible to see how young these children begin to bear the family burdens. Many of them really have no childhood. One little girl entered as six years old, but looking younger, came to the school with a bad finger. On questioning her we learned that she had run a sliver under her nail while scrubbing the hall. On further questioning, it was learned that it was her work to do the scrubbing, while her sister, eight years of age, does the sweeping and dish-washing. The mother is a widow and supports her three children by washing.

A teacher called to see why little seven-year-old Lillie was absent. She was found sweeping the room; the broom handle extended a long way above her head. Her father died, insane, two years ago, and the mother goes out to work at six in the morning. Little Lillie takes care of the other two children and keeps the home in order. The mother washes the children's clothing at night and makes over clothing that is given to her.

Sickness, loss of employment or desertion of the bread-winner has caused much suffering among our families, but when the food runs short and the children go supperless to bed, and to school without breakfast, we come to their assistance. The children are supplied with food and clothing, and groceries and coal are sent to the parents to tide them over their misfortune.

I wish to thank our dear friend Mrs. J. M. White for supplying the means to feed and clothe so many needy ones, and Mr. James Speyer for the bountiful Christmas dinner; also Mr. Cutting, the Misses Williams, Mrs. Horton and the kind friends who came to amuse the children at the Christmas entertainment.

Number of children enrolled during the year	378
Daily average attendance	216
Number of meals served	28,376
Number in sewing classes	87
In manual training classes	36

Respectfully submitted,
E. Robertson,
Principal.

The Lord Memorial School, Nos. 173 and 175 Rivington Street.

(Reestablished in 1893 in memory of J. Couper Lord and George de Forest Lord by their friends.)

Annual Report of the Principal.

At the annual inspection of our school by the City Superintendent last year, our teachers received excellent marks, and were highly commended for their methods of instruction and quality of work. He said he thought we deserved better accommodations, and he wished he might see us in a new building. We hear very good reports from the children promoted by us to the public schools. Three of ours stood the highest in a class of forty-seven.

A mother came to me one day with a beaming face, saying: "I have good news! I am so happy! My Jessie has won a prize." On questioning her I was surprised and delighted to learn that her daughter, one of our former pupils, now in the grammar department of the public school, had received one of the New York *Times'* Medals for her "Essay on the History of New York City." The daughter came to show us the medal and the essay. She said she was glad it was a medal instead of money, for the former she could always keep, while the latter would have to be spent, as her family were really very destitute. Her widowed mother has a hard struggle to keep her in school, and were it not for the help obtained from us from time to time, would be unable to do so.

During the Jewish holidays we have many visits from our old pupils who are now working. They take that opportunity of coming back to the old school, which they remember with evident pleasure. A fine, manly young fellow came in to see me this fall, who was among our first pupils in this building. He expressed gratitude for what the school had done for him and his family when they were in need. His ambition is to become wealthy in order that he may do good. He said, "I hope some day to be able to write out my check for $200,000 to give you a new building." He pointed out the desk at which he used to sit, and asked as a favor, should the desk ever be taken away, to have the top of it saved for him, so many pleasant recollections clustered around it. His affection for the place and the teachers seemed sincere; as he expressed it, "I shall never forget you; if the school is here for fifty years, I will come to see you every year."

The following is a note of thanks from one of the mothers who never fails to acknowledge a favor. "Dear Miss J.: I thank you very much for the groceries you sent me. I really didn't have anything in the house. God shall never forget you. I wish that no bad air should come on you and your family. Yours truly, Jennie K——." This woman has a sick husband and seven small children. Her two older boys are just beginning to earn a little. She is not strong and has had a hard time to get along.

Last summer the kindergarten children had a small garden in the school yard, in which they planted seeds, watering and attending to them under the teacher's direction. This real gardening was of great educational value to the little ones, who know almost nothing of country life.

The children had their usual Christmas exercises and simple presents, which made them very happy. In the summer their treat of ice cream was a special delight. For these pleasures they are largely indebted to their friend Mrs. George de Forest Lord.

A large number of boys and girls went to Bath Beach, which was a delightful outing for them.

Children enrolled during the year	704
Children on register October 1st	379
Daily average attendance	363
Daily average attendance in Kindergarten	132
Sewing class	97
Boys' manual training classes	75
Sent to public school	234

Respectfully submitted,

ANNA JOHNSON,
Principal.

Avenue B Industrial School, 535 East Sixteenth Street.

(Elected in 1897 by WILLIAM WALDORF ASTOR, Esq., in memory of MRS. ASTOR.)

Annual Report of the Principal.

During the past year our school has tried to fulfill its mission in relieving as many cases of distress as we had the means to relieve. There were still other cases that we might have helped, but our limited means obliged us to pick out those whom we thought most needy.

Our kind friend Mr. William F. Decker provided many pairs of shoes and warm clothing for our little ones, who otherwise would have been obliged to stay out of school. We are indebted to him also for an entire set of new tools for the carpentry class. The boys of this class are truants, and new tools seemed to make their work more attractive. These boys are retained in school only by making their work sufficiently interesting. It is very hard to get them into school, and when in, to keep them. I will cite an instance of how one boy was brought in. Thomas S.—— had not attended school, but was friendly with our boys, and for a long time had annoyed us very much by calling to the boys and keeping them away. One day the teacher offered a quarter to the boy in the class that would bring him in, and that very afternoon he came in, very dirty and ready for mischief, but became interested in the woodwork and carpentry, and has been pretty regular ever since.

The classes for crippled children did excellent work. Miss Jones and her board of ladies were untiring in their efforts to make the lives of these unfortunate little ones brighter and more useful. Their two weeks' stay at Atlantic Highlands in June proved very beneficial. Many of the children had never been out of the city before, and they thoroughly enjoyed it.

We wish to thank Mr. F. Delano Weekes for our treat of ice cream the last day of school, and Mrs. Smith for her weekly baskets of flowers during the summer.

Miss Draper's timely donations relieved many cases of want.

Number of children enrolled during the year...........	682
Daily average attendance..........................	356

Number of meals supplied	62,177
Number of children promoted to grammar school	46

Respectfully submitted,
NETTIE W. SEXTON,
Principal.

Sixth Street School, No. 630 Sixth Street, near Avenue C.

(Erected in 1891 by MRS. WM. DOUGLAS SLOANE.)

Annual Report of the Principal.

The school visitor and teachers called upon 573 families and found some miserable, forlorn cases. These families were assisted when necessary in the way of shoes, clothing, food and coal. In helping the poor, the City Mission nurse rendered very valuable services to the school; she called every morning and spent two hours caring for and relieving all conditions of physical ailments and also visited the children and parents at their homes. We supplied medicines and eye-glasses for children who were too poor to purchase them.

The mother's sewing meeting was well attended. They enjoyed the social hour and a half of sewing and chatting interspersed with occasional games and refreshments.

The truant boys brought to us by the officer have proved themselves to be regular attendants. They became very much interested in the manual work and their deft fingers produced some very practical and pretty work, such as baskets, candelabras, inkstands, as well as sewing laundry-bags, toboggan caps, marble bags, etc. Three of our boys secured positions in a basket factory, having gained a knowledge of the work in school.

During July and August our airy building was used for a summer school. Each day brought new faces from the crowded and overheated rooms into the pleasant and cool classrooms.

As our children were to enjoy a bounteous dinner at Thanksgiving donated by Mrs. William D. Sloane, I suggested that they, too, could pass on the kindness by providing dinners for some unfortunates; so all that were able brought one potato or other vegetable and the amount raised was enough to benefit ten poor families of the neighborhood. They all thoroughly enjoyed the giving and their own feast was more appreciated.

Christmas is the most jolly time at our school, each boy and girl being the recipient of two useful gifts as well as the goodies and sweets from the Christmas tree. Our Santa Claus, dear Mrs. Sloane, is always with us, too, which makes the event all the more enjoyable.

Comfortable, ready-made underclothing, shoes, dresses, trousers, books and candy were generously sent to us by Mrs. Eastburn Benjamin and daughters, Miss Ten Broeck, and Miss Henrietta Rhoades at Christmas and Easter.

Thanking our friends for their kindness and assistance in the good work.

Children enrolled during year	1,108
Daily average attendance	509
Kindergarten average attendance	120
Lunches and meals	83,119
Children sent to public school	59
Carpentry and whittling class	40
Cooking class	22
Venetian and reed work	32
Number of depositors in penny bank	228
Amount deposited	$58 74

Respectfully submitted,

Anna B. Shields,

Principal.

Sullivan Street School, No. 219-221 Sullivan Street, near Third Street.

(Erected in 1892 by Mrs. JOSEPH M. WHITE and Miss MATILDA W. BRUCE.)

Annual Report of the Principal.

The Boys' Carpentry Class, under the care of Mr. Hahn, was a great success. The large row boat which was made and taken to camp this summer gave a great deal of pleasure to a number of boys. Through Miss Bruce we were able to give the warm dinners, which means so much to the little children; she also, with Mrs. White, pays for the boys' suits and the candy at Christmas. Mrs. White pays for two visitors, who have made 1,356 calls on the poor and sick; and with Miss Rhinelander, pays for the shoes.

Mrs. J. Hooker Hamersley paid for a trained nurse who went into the homes and took care of the sick, which has been a great blessing to the poor, tired mothers. Mrs. F. S. Witherbee gave the toys at Christmas. Through the help of Mrs. J. M. White, Miss Rhinelander and Mrs. J. Hooker Hamersley, we were able to give sewing to a number of mothers.

We would like to express our gratitude to Mrs. White, Miss M. W. Bruce, Mrs. Witherbee, Mrs. Hamersley, Miss Rhinelander, Mrs. Griffeth, Mrs. Stimson, Mrs. R. J. Thompson and The Odds and Ends Society of Montclair for their loving help during the past year.

Children enrolled during the year	856
Daily average attendance	566
Hot dinners served in school	91,786

Respectfully submitted,

SARA S. ROE,
Principal.

Jones Memorial School, 407 East Seventy-third Street.

(Erected in 1890 to the memory of JAMES I. JONES and ELIZABETH JONES, by their son.)

Annual Report of the Principal.

So many parents have to turn their children on the street when they go to work that we have formed an afternoon class, where they can remain till called for.

Many garments are required by the children, and we furnish employment in sewing to a number of mothers, who are glad to earn a little to meet the household expenses rather than seek assistance as charity.

To Mr. James H. Jones we are, as ever, deeply indebted for the many ways in which we are enabled to dispense charity through his interest and sympathy. In some extreme cases we have cared for families for weeks that without such help would have become public charges upon the city.

An entertainment for the parents and an exhibit of children's work was given at the close of school, and many a little lad received a loving pat on the head as his father critically examined his work, his face the while beaming with pleasure.

Mrs. A. Newbold Morris's entertainment for the children on the first anniversary of her grandson's birth was heartily enjoyed.

Number enrolled during the year	636
Average attendance	441
Sent to public school	98
Number of hot dinners	30,527
Number pairs of shoes given out	115
Number garments made	433

Respectfully submitted,

ELLA WELLS,
Principal.

Mott Street School, No. 256 Mott Street.

(Erected in 1888 by John Jacob Astor, in memory of Mrs. Astor.)

Annual Report of the Principal.

Our ill-fed children hail with delight Miss Travers' request that hot dinners begin a month earlier than the regular time, which Mrs. James provides. It is a daily occurrence to have children come to school without having tasted a morsel of food and say, "Miss L——, papa went to work early, mamma went to sew pants in the shop—I can find no bread to eat; may I have two plates of soup when we eat?"

One little boy, a cripple, never missed a forenoon and after eating his soup, tucked his share of bread in his jacket to take home for his little brother.

Miss Travers is the only Santa Claus our children know. Also through her generosity forty of our boys go to camp, and during the entire year never tire of telling something that happened in camp. On Tuesday evenings the large boys come for drill, and long before the appointed time these boys may be seen outside the school patiently awaiting.

The missionary and nurse of the New York City Mission gave valuable treatment of various kinds and has tenderly looked after the children both at school and in their homes.

Could the friends and patrons of our school, who have so generously provided gifts of clothing, shoes, mittens, flowers and money for the wants of our destitute children see the comfort and happiness they have given, and hear the prayers uttered so earnestly for those who helped them, they would realize that their kindness was fully appreciated. One case I will relate. During the cold weather last winter I received the following note:

"DEAR MISS DWYER.—Dominic can not come to school to-day or any more mayby, for pa has been sick three weeks, we have no coal or money and Dominic has gone to look for work in the street. Your pupil—ANNIE."

Upon investigation I found a family of nine in a destitute condition. Money was given them to buy food and coal, which brought much comfort and happiness to the family. Dominic returned to school and graduated with his class in February. The following note was received a few weeks after graduating:

"DEAR MISS DWYER.—I am sorry I cannot go to Marion Street School as you said, but I am the oldest, you know, and must start to help now to keep the rest in school so we won't be hungry next time. I am coming to see you soon. Do not forget me.

Your pupil—DOMINIC."

Love and human sympathy satisfy the wants most keenly felt by these discouraged, downtrodden children.

Children enrolled	781
Daily average attendance	459
In sewing classes	126
In boys' manual training class	140
Number of meals given	64,338
Absentees visited	1,800
Number of children sent to public school	39

Respectfully submitted,

ELIZABETH F. DWYER,

Principal.

Phelps School, No. 314 East Thirty-fifth Street, Between First and Second Avenues.

Annual Report of the Principal.

The attendance has steadily increased, until at the present time we have nearly five hundred pupils on register, which taxes our building to its utmost capacity. At our examination by the

City Superintendent of the Board of Education, he said we were doing excellent work under great disadvantages, as our building was too small to meet the needs of our school. We find our children studious and the Italians, who are naturally artistic, excel in drawing, water-color and brush work.

Our industries have progressed most satisfactorily. The caning class, which was a new feature of our work, have reseated many chairs that the children have gathered from the poorest families in our neighborhood. The basket weavers have made many pretty and useful baskets. Our cooking class, supported by Mr. Osborn, have made simple, practical dishes, which are of great use to them in their homes, for some of them are the housekeepers of the family.

The cripple class has now been in existence nearly two years, and it is very encouraging to note the steady progress it has made. During our recent stormy weather when the wagonette stopped at the home of Albert M——, his mother said he could not go to school as it was too stormy, but the child cried so bitterly, saying he was only happy when in school, that she decided to let him go.

Our kind friend, Mrs. Anson P. Stokes, who provides hot dinners for our children (this their principal and to some their only meal) sent one hundred dollars to be expended for coal, which enabled us to help many. We are deeply indebted to Mrs. Stokes and Mrs. Sands, who never fail to remember our little ones at the Christmastide with dolls, toys and candies. One hundred and fifty of our poorest children were entertained on Christmas Day by Mr. and Mrs. Lewis Cass Ledyard, at their home and fifty dollars in gold was given to the principal to relieve any destitute cases. Our school has sustained a loss by the death of Mrs. Wm. E. Dodge, Sr., who was always a kind friend to us. In conclusion we want to thank the members of the Girls' Industrial Club for the warm garments for the boys and girls at Christmas time, and to the Tuesday morning sewing class for the many garments sent during the winter; also to the many other kind friends who have so generously aided us.

Children enrolled during the year	828
Daily average attendance	381
Daily average attendance in Kindergarten	105
Meals given	46,064
Children sent to public school	136

Respectfully submitted,
M. LOUISE STEWART,
Principal.

Pike Street School, 28 Pike Street.

Since last year our school has sustained great loss and been overcome with grief at the death of two of our well-loved friends. Mrs. John H. Screven was called to her heavenly home in December last. For forty years she was a devoted friend of the school and was untiring in her work for it. She began as a young girl, when Miss Van Rensselaer, to take an interest in the little ones, and would often give them an outing to Central and other parks.

A pupil of the school at that time, who afterwards became its janitress and later married and left the city, visited us a short time since and shed tears of grief when she learned that Mrs. Screven had passed away. She recalled the many kindnesses shown her by Mrs. Screven and the pretty and useful gifts she had received from her when a pupil of the school and as a janitress.

Mrs. Screven not only gave liberally toward the support of the school, but she showed a deep interest in the teachers and scholars. At Christmas she always insisted that every girl receive a doll and every boy a toy, in addition to the useful articles provided by the other kind ladies of the Board.

Mrs. Buckley first visited our school about five years ago, and has ever since been our warm friend. Although advanced in years, she, with her own hands, made dozens of dainty garments and hundreds of beautiful scrap-books for our little ones, and has given her money to relieve many cases of extreme poverty. This dear friend and lover of children was called to her well-earned rest in July. We will miss her bright, happy smile and cheery word, as well as her substantial gifts, more than we can tell. All who knew her loved her.

We feel that much has been accomplished in our school work during the year. Both teachers and pupils have worked faithfully and good results have followed. The children who joined the new classes, formed last year in manual training, have derived great benefit and much pleasure from the work. In some cases the children of the manual training classes have taught their sisters and brothers at home what they have learned at school. This is our aim—through the children to reach the homes and make them better and brighter.

I think I can say that the hearts of all our teachers are in their work. A physician from the Board of Health, visiting our school, commented upon the good condition in which he found the children. He remarked that he thought this was owing largely to the care the teachers gave the pupils. "The teachers here," he said, "do not use their heads alone, but their hearts also."

In almost all cases the parents show deep gratitude for what is done for their children. One of our teachers has had, at different times, in her class several pupils who, through deafness caused by illness, have been backward in talking. She has been very successful in teaching these children to articulate distinctly. One Russian mother visited by this teacher expressed great joy that her child had been taught "to count, say words, and spell." She said, "Oh, I so happy that my girl learn all this—you are so good to her—what can I do for you?"

The ladies of the Board, Miss Delafield, Mrs. Winters, and Miss Lee, continue their generous donations to us. Hot dinners throughout the year, at Christmas three well-filled trees and substantial gifts of shoes and clothing, and in May a picnic to Central Park. Again this year our kind friend, Mr. Gerald L. Hoyt, gave the school a delightful trip to Coney Island. As last year, our good friends at Catskill sent some of our children to the mountains for two weeks. These same kind friends send us each year a huge New Year's box filled with substantial gifts which bring cheer to many homes.

Our generous and energetic young friends of the "Junior Christian Endeavor Society of the First Congregational Church of Mt. Vernon," led by the Rev. Mr. Lovejoy, his wife and Miss Victoria Bell, presented us with over a hundred potted plants on Arbor Day. These plants gave unbounded joy to the children and their families.

We are much indebted to Mr. Geo. C. Smith and his family for a large donation of magazines and children's books, and for gifts of clothing, toys and cakes at Christmas.

Many other good friends have been most kind and generous to us, and to all of them we offer our grateful acknowledgments.

Children on register	275
Daily average attendance	240
In kindergarten	67
In sewing class	60
In manual training class	17
Children sent to public school	227
Visits made by teachers to homes of the children	591
Hot dinners served	32,910

Respectfully submitted,

ISABELLA F. HOOK,

Principal.

Tompkins Square School, No. 295 East Eighth Street, Corner of Avenue B.

IN THE TOMPKINS SQUARE LODGING HOUSE.

(Erected in 1886 by MRS. ROBERT L. STUART.)

Annual Report of the Principal.

Those of our children who have completed our school course and gone on to the public school, have good reports in the different classes. A note received from one of the Principals read as follows: "Dear Miss S.: I will certainly be proud of your girls, if when they graduate from my school they are as good scholars as they entered it. Miss J.—" The Principal of the Boys' Grammar School also commended them. We have also received very high praise on the manual training work done by our children.

The branches of manual training taken up in our school are cooking, sewing, basketry, construction and Indian bead work, for both boys and girls, with woodwork and Venetian iron for the boys alone. The boys take great pride in their sewing and cooking, and enjoy it heartily. This year we expect to have a chair-caning class and would also like to have cobbling.

Last year our Penny Savings Bank proved a great success, as the children saved more pennies than ever before, and in many cases the money saved was a real help over a hard place when father or mother was out of work.

The Mothers' meeting still continue one of the pleasant features of our work. They have been the means of bringing home and school in close relationship. We thank Mr. D. Willis James most heartily for the necessary help to carry on this special work. We also have to thank him for many things which his unceasing kindness supplies, such as the warm dinners, shoes, and comfortable clothing we are able to give out during the winter, and at Christmas time the fairy tree with its load of good cheer for the girls and boys.

We also wish to thank all the friends who have so kindly remembered us in many ways. Mrs. Snyder, of Berkeley, Cal.; Mrs. Rogers, of Scarboro; Mrs. Heyer, and Mrs. Kling.

When the Superintendent of the Board of Education visited the school he was well pleased with the work throughout the school.

Children enrolled	828
Average register	453
Average attendance	384
Kindergarten	120
Sewing classes	129
Sent to public school	176
Meals supplied	24,452

Respectfully submitted,

EMMA F. SINN,
Principal.

West Side Italian School, No. 24 Sullivan Street.

Annual Report of the Principal.

The interest of the children in their school is touching as well as encouraging. The school attendance is remarkable. This fall, on the opening days, the crowds of children baffled description. We feared for the building, which, as every one knows, is an old one. It seemed as if the stairs could not possibly support the crowds of parents and children that surged within the building. Considering we have only the lower primary grades, we have done good work in manual training. The boys have gained much praise for the chair-caning. Teachers and children have alike worked with enthusiasm. Mrs. Gustam's class made nice rugs knitted from rags, the knitting needles having been made by the boys. Miss M. E. Schlegel's class in hand sewing and Miss M. E. Sinn's in basketry, pyrography and chair-caning have worked well.

We have also added another industry, Indian bead work, to our list. Our kind friends have helped us, as usual, through the long, hard winter months. Mrs. Bowlker gave us our Thanksgiving dinner, as she has for so many years. Mrs. James A. Roosevelt is our guardian angel. Mrs. D. Willis James feeds the hungry little Italians in our midst. For our beautiful Christmas festival, with its splendid trees, candies, cakes, toys and shoes, and for all other nice things, let me thank with grateful prayers Mrs. James A. Roosevelt, Mrs. Bowlker, Miss Rickhard, Mrs. Seward Webb, Mrs. E. N. Vanderpoel and Mrs. S. F. Vanderpoel, Mr. W. Bayard Cutting, Mrs. Robert Goelet, Mrs. William Willcox, Miss Helen Weston, Mr. and Mrs. Gustav E. Kissel, Mr. and Mrs. Archibald Russell, Mr. and Mrs. Douglas Robinson, Mr.

James K. Gracie, Mrs. Satterthwait, Mrs. Trenchard, and Mrs. Edward Wicks. Our kind friends, the Misses Williams, interested a band of sweet young girls, among them Miss Louise Baldwin and a number of her girl friends. At the Christmas festival these kind young ladies arranged to have sent to the school a splendid doll house. The kind donors came in person to witness the delight of the children. "Our house," as the children proudly call their possession, is an unfailing pleasure to the whole school.

Through the generosity of Mrs. James A. Roosevelt the children enjoy every year an Easter treat of ice cream and cakes, and the same upon the closing day of school.

Miss Snelling, the nurse from the City Mission, continues her tender ministrations among the poor and sick Italians. Mrs. Theodore Roosevelt, with her usual kind interest in the school, sent the children a fine set of stereopticon views. This is a great treat and delight to the children.

A characteristic conversation I had with a class of boys last fall, in regard to the coal strike, I feel I must transcribe here. The class of boys, thirty in number, were having their morning spelling lesson. The word "coal" had just been spelled, and, of course, in the remarks that followed, the coal strike was mentioned. The boys came out strongly on that theme. Pasquale, in solemn tones, informed me he feared there would not be a fence left standing, adding in almost tearful earnestness, "Then, Miss Satterie, the theaters can't put up their posters." Exclamations of horror followed this harrowing statement.

Number of children on roll	303
Average daily attendance	281
Meals given	54,546
Boys in basketry	28

Boys in chair-caning	36
Boys in pyrography	30
Girls in sewing	58

Respectfully submitted,
MATTIE GRIFFITH SATTERIE,
Principal.

Probation Department, Under the Supervision of Children's Aid Society.

PROBATION COMMITTEE.

Mr. Evert Jansen Wendell, *Pres.*
Mrs. José Aymer, *Vice-Pres.*
Mrs. Homer I. Ostrom, *Sec.*
Mrs. Willard Parker, Jr., *Treas.*

COMMITTEE.

Mrs. Robert Abbé.
Mrs. Britton Niven Busch.
Mrs. Robert Maclay Bull.
Mrs. Miles B. Carpenter.
Mrs. Paul Dana.
Mrs. Samuel Dodd.
Miss Laura J. Edwards.
Mrs. Warren Goddard.
Mr. and Mrs. John H. Hammond.
Mrs. James J. Higginson.
Miss Kobbé.
Mrs. Arthur W. Little.
Mrs. William M. Leeper.
Miss C. R. Lowell.
Miss Louise B. Lockwood.
Mrs. Hall McCormick.
Dr. Homer I. Ostrom.
Mrs. Willard Parker.
Mr. and Mrs. Willard Parker, Jr.
Mrs. John Rogers, Jr.
Mrs. Horace See.
Mrs. James Speyer.
Mrs. Frederick Stimson.
Mrs. J. Kennedy Tod.
Mrs. Schuyler Van Rensselaer.
Mrs. Howard Van Sinderen.
Mrs. John Wells.
Mrs. Jacob Wendell.
Mrs. Jacob Wendell, Jr.
Mrs. Isaac S. Wheaton.
Mrs. C. A. Whitney.
Mrs. Edward Winslow.

ANNUAL REPORT OF THE PROBATION OFFICER.

Yesterday at my desk I wrote down number 921 on the envelope of a case I was filing away.

It meant that just that number of cases had passed through the hands of the Probation Department since it started its work in the Court of Special Sessions less than three years ago.

Out of the 921 cases that we have treated, 188 are in our hands awaiting final disposition. Each represents one or more boys who have been or are now bad. We have a limited time in which to make them good or hand them over to the court for sterner discipline than we can employ. When a boy first comes to us we ascertain at once the nature of his home.

If his home is good, we put him in it and try to reform him by supervision there, and by strengthening the hands of his parents in their efforts for his welfare.

When we take a boy whose home is bad, we frequently restore him to it, hoping that his prison experience and our close oversight will enable him to rise above the influences of his surroundings. The boy with no home at all makes the greatest demand upon us for intelligent treatment. Here the Society comes to our aid with its Lodging Houses and placing-out system. Though the Society has not sent many of our boys West or South, yet of the few I cannot recall one who has returned to us as a failure.

When we do fail it is with boys left in the city, and frequently the hand of the ignorant and foolish parent thumb-marks the margin of our lack of success.

One a month would be about the average of second offenders that come back to us for reconsideration, and some of these we try again. We may not have made a thousand ornaments to society out of our thousand boys, but we may have kept these same boys from being drags upon the wheels of progress. We have tried to take them from the preying class and make of them producers.

We have now 374 boys on suspended sentence. The figures that our work gives show its value. The quality of what we do proves it.

David Willard,
J. C. Graveur,
Probation Officers.

HER NEW HOME.

APPENDIX.

APPENDIX.

LETTERS FROM THE CHILDREN.

A COWBOY.

Frank D——, 12 years old. Both parents are dead. Mr. B—— took him into his home in 1901, and the boy has been like his own child ever since.

McL——, Neb., Nov. 9, 1903

Dear Mr. Holste:

I have not wrote to you for some time, so I thought I would write as you might not know what became of me.

I have been out here two years and have growed two inches. I can eat about as much as a man. I have only been sick one day since I have been here, and then I ate too many grapes.

I go to school, but just at present we have vacation, so I am herding cattle now. I am learning to be a cowboy, any way a kind of a one.

I have got a calf and a pony.

I guess that's all I can write this time so good-bye.

From your friend,
Frank D—— B——.

EVERYTHING GROWS FAST.

C——, Texas.

Dear Mr. Brace.—I am going to school at K—— this fall. I like to go to school. I am growing fast. I want you to write a letter and tell me how the farm school boys are getting a long.

I have got 12 little pigs. I have got about 100 little chickens. I went to C——. I like C—— fine. My horse is getting fat and my two calves are getting fat. I would have some turkeys but they died. Come to see me when you can. I don't wear my glasses much. I could see in them good.

I ride my horse to the pasture every morning when I carry our cows to the pasture. I have my dog help me carry the cows to the pasture. We are having a good rain here. Our corn and cotton is growing fast. My pigs and chickens grow bigger and bigger. We have got a pretty garden and a lot of good things in it. We have some pretty flowers in the yard. We have got a lot of cain wich we feed to our hogs and horses. We have got some peach trees in the garden. Tell Mr. Bugbee to come to see me when he can. This letter is from Edward G——

C——, Texas, July 20, 1903.

Dear Mr. Brace:

I promised to write to you and tell you how Edward was getting along. He is doing fine. I asked him how he likes to stay. He said that he liked it first rate. He is a fine boy and smart, too. He is doing well. My wife thinks he is the only boy in the world. We have no children but him; we surely do like him. I gave him a horse to ride, and told him if he wanted him he might have him, and my wife gave him a calf. He thinks they are fine.

I will close for this time,

Yours truly,

W. R. C——.

COULDN'T DO WITHOUT HIM.

Arthur W.——, 9 years old, is an orphan. We had to find him several homes, as he was restless and did not give satisfaction. He is now doing very well.

R—— M——, Tex., Aug. 23rd, 1903.

Mr. R. N. Brace:

Dear Sir—After waiting longer than I ought to have, I will answer your letter. This has been a very busy year with the farmers down here.

Well, Arthur is getting along all right. I suppose he is as good a boy to work is I ever knew, but he is so dull in his books. Wife has put in a great deal of time trying to get him started in his book by the time school begins. She gives him a lesson each day, seldom missing a day. We would be better pleased if he could learn. Wife has had to switch him once only. Don't understand that was all he needed. We both hate to whip him. We try to teach him how to do every thing on the farm. The first horse he rode he fell off. He has gone to Sunday School now on horse, very much pleased to think he could ride two miles to church by himself. He is lots of company. Wife thinks she couldn't do without him. I hope he will do well and make a useful man.

Well, come to see him when you come down in Tex.

I am, Resp.,

A. J. L——.

NO HAPPIER BOY LIVES.

R——, N. Y., June 14, 1903.

Mr. Holste:

Dear Sir.—It will be three years the 26th of this month since Mr. Neil left a little pale-face, sad-eyed boy, name John McK—— at my door. I wish you could see him to-day.

No happier boy lives. He has grown ten inches and weighs eighty pounds.

Last week he passed the Regents' examinations in Arithmetic, Geography, Physiology, Drawing, Language and Spelling. His lowest paper was marked 88. The others, over 90—Physiology 100. He is twelve this month, and has a new bicycle for his present. He is a good worker and a perfectly reliable boy. Not once has he been disobedient, or untruthful.

On July 1st I shall take him with me for a visit to Syracuse, Rochester, Niagara Falls and Buffalo. In the fall I hope to bring him to New York.

It would be a great pleasure to him if you would write that you had received a good report of him. He often asks if I think you care about him. He takes my name and is known as John M. B——.

Respectfully,

(Miss) E. M. B——.

A MISSOURI TRAPPER.

Arthur A——, 10 years old, his father is dead and his mother cannot care for him.

M——, Mo., October 21, 1903.

Dear Mr. Bugby:

I got your letter and was glad to hear from you. I go to school every day and like my teacher. I can add a little. Did you get my letter where I asked when my birthday was? We have a white calf.

I can husk corn. I made six Rabbit traps to catch Rabbits in when cold wether comes. I want you to come and see me soon.

Your little friend,

Arthur A——.

A TRUE MOTHER.

Letitia A——, 10 years old, was a foundling, but now has a real home.

T——, Neb., April 18, 1903.

Dear Sir.—We should have written you before this, but hope you will pardon the delay.

I write you concerning the little girl, Letitia A——.

She is growing remarkably fast, and has good health. We have had our patience tried many times this past winter, as she is an uncommonly restless and mischievous child, and the school teacher entered many complaints to us.

Then we have a store and she would watch her chance, and before we found out, she had carried to school candy, fruit, tablets and lead pencils by the wholesale, and distributed them among her mates. We were at times on the verge of giving up the idea of ever making anything good out of her. We *never* whipped her for it, but talked to her about it, and it would break her heart to tell her we thought of letting her go. So we have kept up our patience and believe we have succeeded in getting her out of that bad rut. If she is promoted at the end of this year, she will enter 6th grade next term. She assists me about my housework by setting table, wiping dishes and some light tasks. It is our earnest desire to make her a good and useful women, and the fact that we have two boys of our own, only strengthens me in bearing with her failings. I will have her write and inclose it in this. She is an affectionate child and is as much attached to my parents and other relatives as the boys are. I shall be glad to have you write to her as well as to myself. MRS. J. H. P——.

T——, NEB., April 18, 1903.

DEAR FRIEND:

I hope you are well. I am well. I will sing and speak at the church to-morrow evening. We have been practicing for Easter most every night of this week. I am learning fast at school. I will be in the room where Gillie and Glen are next year if I pass examination. I go by the name of Lutie P—— instead of Letitia A——. I am contented with my home. I will close for this time. Write soon.

LUTIE P——.

A WORKER.

Willie J——, is 12 years old. His parents are supposed to be dead.

G—— M——, MINNESOTA, Dec., 27, 1902.

DEAR MR. BRACE:

I hope you are well because I am well. We are having a nice time out here in the country sliding down hill. Mamma and Papa went to Rochester to see what the matter was with mamma. I am doing the work while they are gone. I am lots of help to them and they say that they are glad they took me. I am going to school and am studying Grammar, Geography, Arithmetic, Spelling and Physiology. I read in the fifth reader too. I am trying to do the best I can to help Mamma and Papa while I am here. We have lots of nice boys and girls here and a nice teacher. We have 25 pupils in our school. I will have to close my letter now with best wishes to you and your boys at the Farm school.

Please answer soon.

From your affectionate worker,

Willie J——.

P. S.—I received your letter long ago but I could not answer it because I was out in the field loading hay and piling up the windrows.

PERFECTLY SATISFIED.

Peter E—— is one of our older boys, 17 years of age, whom we sent out West. His parents have been dead many years.

March 15, 1903.

My Dear Mr. Bugbee:

I anxiously write to you to explain to you how I like my new and changeable home with Mr. M—— at M——, Mo., and Well. I am perfectly satisfied in every respect, and like my place in every way. I have two horses to attend to, cows, chickens, hogs, sheep, etc., all of which I take good interest in. I get more than enough to eat and plenty of good sleep. Although the house is not the latest style and in a wilderness, yet I find everything very comfortable, as much as my guardian Mr. M—— can possibly make it, and I think that the other boys can fare hardly as well as I do. The very first thing that my boss gave me was a gold watch. Now that was quite a present to get while knowing a stranger. Don't you think so? I hope that you arrived home all right and will enjoy your visit, as I am at present, and also hope that the other boys will write to you to let you know how they are getting along, and how they like the new home. I suppose you know that there

HAPPY CHILDREN IN THEIR NEW HOMES.

is a great difference in this place from the city, but I think that I will get used to it. Hoping to see you in a couple of weeks and see my new home and all the other boys' home, I close my letter with best wishes to all. Will write to you often.

Your boy,
PETER B. E——.

A VIOLINIST.

Katie J——, 13 years old, was surrendered to us by her parents who were unable to care for her.

C——, N. Y., 1903.

DEAR FRIEND:

I will now take time to write you a few lines to let you know I am getting along nicely in my new home. I like my new parents very much. My parents have gone to B—— to spend a few days and I am keeping house. I will be very glad when my school begins. I will finish my last grade this year, and if nothing happens, I will go to Jasper to McKinley's Memorial College. My sister is at home to spend her vacation but will soon have to go back to school. I never get home-sick because there are many children here from New York. I spent part of my vacation at K—— Lake. I have taken lessons on my new violin so I can play. I am very lonesome without my parents.

Yours truly,
KATIE J——.

HAVING A GOOD TIME.

Augusta H——, 12 years old was taken to Minnesota two years ago. At first very restless, she is now happy and contented, and will soon be legally adopted.

G——, MINN., Oct. 14, 1903.

MR. BRACE:

I thought I would write you a letter. I am having a good time. I go to school every day and have not missed a day yet this term. I like my teacher. We are having some nice weather now. I am going to have some company to stay over night with me to-morrow. I have a sheep now. We have a telephone in our house now. I like to talk on it. We have some new neighbors. We have lots of vegetables in the cellar now. Pa is going to town to-morrow to bring some barley. I will close for this time.

Yours truly,
AUGUSTA H——.

CASHIER OF A BANK.

Louis L. B——, an orphan, was placed by us seven years ago in the home of Mr. C. H. J——, President of the Bank of P——, and Cashier of the F. C. Bank. Louis is now 19 years of age, and following in the footsteps of his guardian.

L. W. HOLSTE:

DEAR FRIEND.—I have written to you several times and received no reply. The only reason I can give is that you never received them. You will notice by the letterhead that I have changed my place of business. At present I am cashier and general manager of the Bank of P——. The real cashier is in S. D. on some kind of a land deal and this bank is an associate bank of the F—— E—— Bank, and that is how I happen to hold my high position. The first thing you will know I will be president of some bank in Chicago. P—— is a very small town about 8 miles southeast of D——. One man fills the position of cashier, bookkeeper and general manager of the bank, so you see that it isn't a very large town. But in spite of all that it is as good a place as any in which to get a little experience in the line of banking, because your experience is not as liable to cost you as much as in larger towns. I am getting along as nicely as usual. I seem to have a talent to get along well. I came to P—— last Monday evening and expect to stay here till Saturday noon. Business is rather slack at present. In fact everything seems to be rather dull in this country. Well Mr. Holste I must close for this time. Hoping to get a speedy reply I remain,

Yours truly,
LOUIS L. B——.

REPORT TO THE COMMISSIONER.

New York, *October* 16, 1903.

Hon. Homer Folks, *Commissioner of Charities, New York City:*

Dear Sir.—I beg to submit a report of the children received from the various city institutions during the two years of your administration. They were transferred to the Children's Aid Society to be provided with permanent homes with families in the country. The brief histories of these children furnished us by your examiners when they were transferred to us reveal many tragedies. Some are orphans, but many others are the victims of neglect and abandonment, or their parents are in hospitals or institutions. It is a striking example of the value of this placing-out work to find that these young lives, so early saddened and tainted by their misfortunes, have soon amalgamated with their surroundings and they have not shown any evil result of their former environment.

To achieve this success, it has required constant watchings, visitation and correspondence by the agents and visitors, and many changes were necessary until the proper home influence was found. Each child is studied individually, as well as the home in which it is placed.

In the following report of the 151 children received and placed in homes since November, 1901, we give a short sketch of their antecedents, and brief description of their new homes, also dates of subsequent visits of agents, and their condition to the present.

A request for removal or for an adjustment is always promptly attended to. In urgent cases a special agent, often at great expense and labor, is sent immediately to remove and to replace a child. The children are visited by our agent or visitor once and often two or three time a year, until it is believed that they are settled, and we remain in constant communication with all of them.

While the success of our work is due to this care, we cannot overlook the work of the local committees and of so many public-spirited men and women of the localities where the children are placed. Among these committeemen are mayors of cities, county attorneys, professors of colleges, physicians and many others who have taken active interest in this work for humanity.

Of the 151 children, two have been returned to relatives, two others will probably be returned to you as morally unfit for family life, and all the rest are doing well in their new homes, and in most instances are on the way to develop into good and useful men and women. These children will continue under our observation for years to come, and we shall be able at any time in the future to continue this report, showing the careers of the children.

Permit me to express to you, Mr. Commissioner, our high appreciation of your co-operation. During your administration we have been enabled more than ever to relieve the city of an onerous and expensive burden, and to place these dependent children in positions where they can grow up to become self-supporting and helpful members of society.

Respectfully submitted,

(Signed) C. LORING BRACE,

Secretary.

A FEW INSTANCES.

Arthur W., 10 years old, was born May 12, 1892. He is an orphan, and was committed by the Department of Public Charities to the Nursery and Child's Hospital on September 12, 1895. He was at our Farm School for a short time, and on January 3, 1902, was placed with Mr. T., at C., Collin county, Texas.

January 28, 1902, the Agent reports this to be a very good home, provided Mrs. T. becomes attached to the boy. Mr. T. took to him at once. They own a very pretty home and fine farm. They have already adopted a five-year-old girl.

January 29, 1902, Mr. T. writes that Arthur is doing well and gets along all right.

April 28, 1902, Arthur writes: "Please come and see me. I am glad you sent me to a good home. I like my home very well. This is a nice home. I like it."

April 30, 1902, Mr. M., the teacher of C. school, writes that Arthur is doing well at school, and never misses a day. He is devoted to Mrs. T. and is well and happy.

April, 1902, Mr. A. of the Local Committee writes that Mr. T. told him Arthur is doing very well, and has become greatly attached to Mrs. T.

June 11, 1902, Arthur writes to Mr. Brace: "I have the finest home there is. I am having a good time. I have two pigeons, and I feed the chickens and the hogs, and I go squirrel hunting and pick weeds."

October 4, 1902, Arthur again writes: "I can pick 70 pounds of cotton a day, but Charlie L. (one of the boys placed by Mr. Brace in the neighborhood) can pick a hundred. Charlie says he also has a good home. I like my home first-rate well, but I don't like school. I like to play with the boys."

November 27, 1902, our Agent visited the home, and reports: "Arthur is doing well. Has been going to school regularly."

February 16, 1903, Arthur writes: "I am doing all right now. I like to go to school. I am learning awful fast. I am in fourth reader and arithmetic and geography and speller, and write to Charlie L., who has a good home."

May 13, 1903, our Agent visited Arthur and found him doing very well. All are very fond of him.

Charlotte B., 10 years old, was born May 7, 1891. Her mother is dead. Her father has been in prison three years for counterfeiting, and his present whereabouts is unknown. Charlotte was referred to the Children's Aid Society by the Superintendent of Public Charities in November, 1901.

January 7, 1902, we placed Charlotte with Mr. L. at W., Nebraska.

January 27, 1902, visited by our Agent who reports that it is a fine home. Mr. L. is well off. Mrs. L. is a lovely woman. They live in town. Charlotte is said to be a bright girl.

April, 1902, our Visitor reports that Charlotte is in a good home, but does not give entire satisfaction, as she is high-tempered and disobedient.

August 13, 1902, Mr. L. writes that Charlotte is doing better. She goes to school regularly, and makes fast improvement.

February 17, 1903, Mrs. L. writes that Charlotte is improving wonderfully in every way.

May, 1903, we receive a fine photograph of Charlotte. The girl writes that she is happy and doing well.

September 9, 1903, our Agent visited Charlotte, and reports that she has an excellent home, and is doing well. She has become very ladylike in her manners. She attends school regularly.

Joseph C., 4 years old, was born April 20, 1898. The Deputy Superintendent reports: "There are three children—William, 6 years old; Joseph, 4, and John, 3 months old—at the Nursery at Randall's Island. The father, Benjamin, deserted the family. The mother, Adelaide E., died six weeks ago. Joseph and John are illegitimate children. The children have aunts and one uncle (unknown) in the city, but they are too poor to care for them. Joseph was committed to the Five Points House of Industry.

March 11, 1902, we placed Joseph with Mr. C., at L., Nebraska. Mr. C. has a brother on the Local Committee, and Joseph has a superior home.

April 30, 1902, our Agent reports that he found Joseph the joy of this childless home. Mr. and Mrs. C. are greatly pleased with their "Joe."

August 8, 1902, Mrs. C. writes that Joe is a fine fellow. They call him Joseph C. C.

December, 1902, Mrs. C. writes another good letter. She sends Joe's photograph. He looks happy and well.

October 7, 1903, Joseph is visited by our Agent. He is a desirable boy in an excellent home. He will attend the District School.

Florence R., 9 years old, was born September, 1892. She has a stepfather living. Her mother is in prison. The girl was committed by the Society for the Prevention of Cruelty to Children to the Five Points House of Industry, February 27, 1901. The Secretary of the S. P. C. C. writes that the parents are unfit to care for the child and her brother and sister and recommends that the Children's Aid Society find homes for them. Florence was kept at our Elizabeth Home in New York City and placed in May, 1902, with Mr. H., at D., Delaware.

May 30, 1902, our Agent reports this to be an excellent home. Mr. and Mrs. H. are of superior education, and very kind. Florence will be happy with them.

June 5, 1902, Mrs. H. writes: "Florence is helpful and willing. We love her already."

June 19, 1902, Florence writes that she is very happy in her home.

September 30, 1902, the home was visited by our Agent, and everything found pleasant.

October 7, 1902, Mrs. H. writes that Florence is well and happy. She encloses a nice letter from Florence to the same effect.

October 25, 1902, Florence was again visited by our Agent. It is a splendid home. Florence is well and happy and attending school.

January 23, 1903, same report by our Visitor.

April 25, 1903, again visited, and Florence is very well, indeed.

Chauncy R., 15 years old, was born June 1, 1887. Brother to Florence R. and Lillian B.

February 21, 1902, Chauncy was sent to our Brace Farm School, and on May 26, 1902, he was placed with Mr. Joseph H., at D., Delaware.

May 30, 1902, this is reported by our Visitor to be a fine home. Mr. H. is a member of the Legislature. His wife and daughter are superior people.

August 5, 1902, Chauncy writes that he has a good home, and is pleased with the kindness of his friends.

September 3, 1902, our Agent visited the boy, and reports him in splendid physical condition. He has grown stout, has improved in manners, and is very happy and contented.

October 25, 1902, Chauncy is again visited, and reported to be doing very well.

January 20, 1903, our Visitor saw the boy at school. He has grown into a very handsome gentlemanly boy.

LILLIAN B., 4 years old, was born March 14, 1898. She is half-sister to Chauncy and Florence R.

May 25, 1902, we placed her in the family of Mr. P., at D., Delaware.

May 30, 1902, this is reported by our Visitor to be a superior family. Lillian is in excellent hands.

August 25, 1902, Mr. P. writes that they are very much pleased with the little girl.

September 3, 1902, Lillian was visited and found doing very well.

October 25, 1902, she was again visited, and the above report was confirmed.

December 23, 1902, Mr. P. is obliged to give up Lillian, on account of Mrs. P's health.

January 15, 1903, we placed the little girl with Mrs. Pr., W., Delaware.

January 30, 1903, this is reported by our Visitor an unusually nice home with nice people. The only danger is of their spoiling Lillian with mistaken kindness.

April 25, 1903, her sister Florence visited Lillian recently, and found her doing very well.

June 25, 1903, everything is very satisfactory with Lillian. She is growing fast.

August 4, 1903, our Agent reports: "Lillian gets along A-1 at school. She has a fine home."

DONATIONS AND SUBSCRIPTIONS

TO THE

CHILDREN'S AID SOCIETY

For the Fiscal Year Ending September 30, 1903.

"A. B."	$5 00
"A. B." Summer Charities	5 00
"A. G. C., in memory of Capt. E. B. Cobb"	25 00
"A. G. S.," Summer Charities	5 00
"A. H. W."	5 00
"A. H. W.," for support of bed, Summer Home	30 00
"A. L. R."	20 00
"A. P."	100 00
"A. P.," Emigration	300 00
"A. P.," Summer Charities	100 00
"A. S. H.," Summer Charities	5 00
"A. W. C."	100 00
"A. W. C.," Summer Charities	50 00
A Friend	1 00
A Friend	1 00
A Friend	2 50
A Friend	50
A Friend	25 00
A Friend	5 00

A Friend, Emigration	$15 00
A Friend, Summer Charities	2 00
A Friend, per Franklin B. Lord, Summer Charities	25 00
A Friend, Gloucester, Mass	10 00
A Friend, Phelps School	2 00
A Friend	250 00
A Friend, Fresh Air Fund	1,500 00
A Friend, special donation	5,000 00
A Friend, Jones Memorial School	800 00
A Friend and Sympathizer	1 00
A Lady at Grand Central Station, Fresh Air Fund	1 00
A Well Baby Boy, Fresh Air Fund	2 00
Abernethy, Mrs. S. M	20 00
Ackerman, E. R	10 00
Adams, B. B	3 00
Adams, B. B., Summer Charities	5 00
Adriance, Rev. Harris Ely	10 00
Adriance, Rev. Harris Ely, Emigration	40 00
Agnew, A. G	10 00
Aitken, John W	10 00
Aitken, John W., Summer Charities	25 00
Albee, Edward F., Emigration	20 00
Albro, Ellen, Summer Charities	10 00
Alden, C. C., Summer Charities	10 00
Aldrich, Mrs. James Herman	15 00
Alexander, Miss Annie D	1 00
Alexander, Mrs. James W	10 00
Alexander, Mrs. James W., Summer Charities	25 00
Alexandre, Mrs. J. H	5 00
Alexandre, Mrs. J. H., Summer Charities	5 00

Alger, Edward G.	$2 00
Alger, Edward G., Summer Charities	2 50
Allen, Charles M.	5 00
Allen, E. Hubert, Summer Charities	5 00
Allen, George G.	10 00
Allen, George G., Summer Charities	30 00
Alliot, P. E., Fresh Air Fund	20 00
Altschul, Charles	10 00
Amend, Mrs. C. A. L., Summer Charities	10 00
Anderson, Mrs. A. A.	200 00
Andreini, J. M.	25 00
"Anonymous"	5 00
"Anonymous"	5 00
"Anonymous," Fresh Air Fund	5 00
"Anonymous"	50 00
"Anonymous"	2 00
"Anonymous," per A. B. Hepburn	13 50
Ansbacher, Marion L., Summer Charities	5 00
Archbold, John D., Summer Charities	50 00
Archbold, Mr. and Mrs. John D., Classes for Crippled Children	100 00
Arend, F. J., Summer Charities	25 00
"Arius"	25 00
"Arius," Summer Charities	25 00
Arms, George	5 00
Armstrong, J. Sinclair	30 00
Armstrong, J. Sinclair, Summer Charities	30 00
Armstrong, Mrs. J. Sinclair, East Side School	35 00
Armstrong, James, Summer Charities	5 00
Armstrong, S. Howard, Summer Charities	5 00

Armstrong, S. H., William C., G. A. and E. H., Emigration	$20 00
Arnold, Dr. Edmund S. F.	10 00
Arnold, Dr. Edmund S. F., Summer Charities	10 00
Arnold, Miss S. Elizabeth, Summer Charities	15 00
Aspegren, Adolf, Summer Charities	5 00
Astor, Colonel J. J., Summer Home	250 00
Astor, Mrs. William, shoes and hot dinners	150 00
Astor, Mrs. William, Fresh Air Fund	100 00
Astor, Mrs. William, Christmas	50 00
Astor, William Waldorf, Emigration	800 00
Astor, William Waldorf, Newsboys' Thanksgiving dinner	200 00
Atlantic Transport Co	10 00
Auchincloss, Mrs. Hugh, Summer Charities	100 00
Auchincloss, John W	50 00
Auchincloss, Mrs. John W	25 00
Auchincloss, Mrs. John W	50 00
Auchincloss, Mrs. John W., Summer Charities	25 00
Auchmuty, Mrs. R. T.	500 00
Auchmuty, Mrs. R. T., Summer Home	400 00
Auchmuty, Mrs. R. T., East Side School	75 00
Auerbach, Mrs. J. S	10 00
Auffmordt, C. A., & Co., Summer Charities	25 00
Austin, Miss Grace L., Emigration	20 00
Austin, Nichols & Co., Summer Charities	10 00
Avery, Mr. and Mrs. Samuel P., Summer Charities	50 00
Avery, Samuel P., Jr., Summer Charities	10 00
Ayers, Dr. Samuel	2 00
Aymar, Miss, Summer Charities	50 00

"B. & M."	$150 00
"B. & M.," Summer Charities	150 00
Babcock, H. D	5 00
Babcock, Miss Maria, Christmas	20 00
Babcock, Miss Maria, support of bed, Summer Home	30 00
Bacon, Daniel	10 00
Bacon, Daniel, Summer Charities	10 00
Bacon, Francis, Co	2 25
Bagg, J. Herbert, Emigration	20 00
Bailey, B. F	10 00
Bailey, Mrs. E. L	5 00
Baker, Charles W	25 00
Baker, H. S., Summer Charities	10 00
Baker, Mrs. Kate Conger	5 00
Baldwin, C. W., Summer Charities	10 00
Baldwin, Frederick H., Summer Charities	25 00
Bale, Charles Edward	1 00
Ballantine, Robert F., Fresh Air Fund	100 00
Banks, Mrs. I. M., Sick Children's Mission	50 00
Barber, Herbert	10 00
Barbey, Henry I	25 00
Barbour, Rev. Robert	5 00
Barbour, Rev. Robert, Summer Charities	5 00
Barclay, James	5 00
Barclay, James, Summer Charities	5 00
Barclay, Mrs. James Lent, Classes for Crippled Children	75 00
Barclay, Mrs. James Lent, Summer Charities	75 00
Barker, Mrs. Fordyce D	5 00
Barker, Mrs. Fordyce D., Summer Outings	10 00

Barlow, Mrs. Annie H., Summer Charities	$5 00
Barnes, Mr.	1 50
Barnes, Herbert S., Summer Charities	5 00
Barney, C. T., Summer Charities	50 00
Barre, Joseph, & Co	5 00
Barrett, C. E	10 00
Barron, George D	20 00
Barrows, Mrs. A. H	2 00
Barstow, Dr. J. W	2 00
Barstow, Dr. J. W., Summer Charities	5 00
Barthman, A.	10 00
Bartlett, Philip G	15 00
Barton, Oliver G., Fresh Air Fund	5 00
Bascom, John	1 00
Bates, Mrs. A. E	10 00
Bates', Rev. Alfred K., children	5 00
Batjer, Henry, Summer Charities	5 00
Battin, Mrs. Annie	25 00
Battin, Mrs. Annie, Summer Charities	25 00
Baylies, Mrs. N. E	20 00
Baylis, William	50 00
Beach, Miss Marion D., Summer Charities	5 00
Beach, W. B	5 00
Beach, W. B., Summer Charities	5 00
Beadleston, Alfred N	50 00
Beadleston, Alfred N., Summer Charities	25 00
Beal, George A	1 00
Beals, C. L	3 00
Beam, W. H	2 00
Beam, W. H., Summer Charities	2 00

Beasley, L. W	$1 00
Bechstein, A. E	25 00
Beekman, Gerard	5 00
Beekman, Gerard, Summer Charities	10 00
Beekman, Dr. John N	25 00
Beekman, Dr. John N., Summer Charities	50 00
Beemer, Mrs. James G., Summer Charities	10 00
Beemer, James G., Jr	10 00
Beers, Albert B	5 00
Benedict, Mrs. James H	5 00
Benedict, Mrs. James H., Summer Charities	5 00
Benedict, Lorenzo	1 00
Benedict, W. de L	5 00
Benedict, W. de L., Summer Charities	5 00
Benjamin, Amy M	1 00
Benjamin, Eugene S., Summer Charities	10 00
Benjamin, H. F	15 00
Benjamin, John	25 00
Benjamin, John, Summer Charities	25 00
Benjamin, M. W., Summer Charities	10 00
Benjamin, Mrs. S. N	10 00
Benjamin, Mrs. S. N., Summer Charities	10 00
Benjamin, Mrs. William Evarts, Summer Charities	25 00
Bernheimer, Mrs. Jacob S., Summer Charities	10 00
Bernheimer, Lorin S., Summer Charities	10 00
Bertuch, Frederick, & Co	10 00
Bertuch, Frederick, & Co., Summer Charities	10 00
Betts, Samuel R	20 00
Bevan, William	5 00
Bevin, Leander A	20 00

Bevin, Leander A., Summer Charities	$10 00
Bible School of Presbyterian Church, Westfield, N. J.	10 59
Bigelow, Mrs. Pauline W., Health Home	10 00
Biglow, Mrs. F. H., Summer Charities	10 00
Biglow, Miss Kate E., Summer Charities	10 00
Billings, Frederick, Summer Charities	100 00
Billings, Mrs. Frederick	50 00
Billings, Mrs. Frederick, Summer Charities	25 00
Billwiller Bros.	20 00
Birney, Mrs. Josephine S., Summer Charities	20 00
Bishop, Mrs. Heber R.	25 00
Bishop, Mrs. Heber R., Summer Charities	100 00
Bispham, William, Summer Charities	10 00
Black, Archibald P.	1 00
Black, Starr & Frost	100 00
Blackman, Charles M.	10 00
Blackman, Mrs. O. P., Summer Charities	10 00
Blackwell, Miss Frances W., Summer Charities	5 00
Blair, J. Inslee, support of bed, Summer Home	30 00
Blakeman, Mrs. Birdseye	25 00
Blatchford, Mrs. Samuel A., Summer Charities	10 00
Bleecker, T. B.	10 00
Bleecker, T. B., Summer Charities	10 00
Blight, Atherton	20 00
Bliss, C. N., Summer Home	100 00
Bliss, C. N., Jr.	20 00
Bliss, C. N. Jr., Summer Charities	25 00
Bliss, Mrs. E. W., Emigration	20 00
Bliss, Ernest C., Summer Charities	100 00
Bliss, Mrs. George T., Newsboys' Lodging House	5 00

Bliss, Mrs. George T., newsboys' dinners	$225 00
Bliss, Mrs. W. H., Summer Charities	5 00
Bliss, Mrs. Walter P., Phelps School	25 00
Bloodgood, John H., Summer Charities	35 00
Bloss, James O.	10 00
Board of Managers, East River School, hot meals, etc.	436 97
Board of Managers, West Side School, hot meals	718 18
Board of Managers, West Side School, special donations	351 60
Board of Managers, West Side School, Summer Home.	50 00
Boettner, Miss Anna	5 00
Boettner, Mrs. H. C., Summer Charities	5 00
Bogert, R. R., Summer Charities	2 00
Boissevain, G. L.	25 00
Boker, Hermann & Co., Summer Charities	10 00
Boland, W. A.	2 00
Bond, Frank S	5 00
Bond, Frank S., Summer Charities	5 00
Bond, J. D	5 00
Bonnett, John B.	5 00
Boone, Edwin	1 00
Boone, Edwin, Summer Charities	1 00
Bostwick, Mrs. George W	5 00
Botsford, S. D., Henrietta School	5 00
Bowdoin, George S., Summer Charities	50 00
Bowdoin, George S., Tompkins Square School	100 00
Bowers, O. H	5 00
Boyd, Mrs. F. O., Fresh Air Fund	5 00
Boyd, Mrs. F. O., Sick Children's Mission	5 00
Boyd, James E., Summer Charities	5 00

Brace, Mrs. Harriet Taylor	$2 00
Brace, Mabel and Maxwell	5 00
Brackett, Miss Anna C., Emigration	20 00
Brackett, Miss Anna C., Summer Charities	5 00
Bradford, Mrs. W. H., Sr., Summer Charities	25 00
Bradley Milton Co.	10 00
Bradley Milton Co., Summer Charities	5 00
Bradley, S. R.	50 00
Bradley, S. R., Summer Charities	50 00
Bradley, Dr. Thomas	5 00
Bradley, Dr. Thomas, Summer Charities	5 00
Bradstreet Co.	10 00
Brainerd, Mrs. Cephas, Summer Charities	10 00
Brebner, John Davidson	25 00
Brebner, John Davidson, Summer Charities	10 00
Breese, Mrs. A. E.	10 00
Breese, Mrs. A. E., Summer Charities	10 00
Brewer, Horatio J., Emigration	20 00
Brewer, Horatio J., Summer Charities	10 00
Brewer, W. A., Jr.	10 00
Brewer, W. A., Jr., Summer Charities	5 00
Brewster, Mrs. A. A.	1 00
Brewster, Mrs. Benjamin	25 00
Brewster, Mrs. F. K.	1 00
Brewster, George S.	25 00
Brewster, H. H., J. C., and Elizabeth Brewster	6 00
Brewster, Madeline E.	1 00
Brewster, Oren	1 00
Brewster, Robert S.	20 00
Brewster, Robert S., Summer Charities	25 00

Brewster, Rouse K.	$1 00
Brinckerhoff, Mrs. Elbert A.	25 00
Brittain, Wm. F.	5 00
"Bro. M."	5 00
Brodhead, Calvin E., Emigration	20 00
Broking, H. C.	2 00
Brown, Mrs. Albert N.	5 00
Brown, Mrs. Albert N., Summer Charities	10 00
Brown, Arthur Alvin	1 00
Brown, Caroline R., Summer Charities	5 00
Brown, David S., Jr., Summer Charities	10 00
Brown, Mrs. Edward J.	5 00
Brown, Edwin H., Summer Charities	10 00
Brown, Elizabeth and Morris	1 00
Brown, George Alexander, Summer Charities	5 00
Brown, Mrs. Geo. Alexander	5 00
Brown, George D., Summer Charities	15 00
Brown, Harold P.	5 00
Brown, Mrs. John Crosby, East River School	10 00
Brown, Lewis N.	2 00
Brown, M. Bayard, Emigration	1,000 00
Brown, M. Bayard, Summer Home	250 00
Brown, M. L.	1 00
Brown, Paul Taylor, Summer Charities	5 00
Brown, Master Richard C.	1 00
Brown, Richard D., Summer Charities	5 00
Brown, S. B.	1 00
Brown, S. Q., 53d St. School	5 00
Brown, W. J.	1 00
Brown, Wm. Reynolds	25 00

Brown, Mr. and Mrs. Wm. Reynolds, Emigration....	$20 00
Brown, Mrs. William Smith, Emigration............	25 00
Brown, Mrs. William Smith, Gen'l Fund and Sick Children's Mission..............................	75 00
Brown, Mrs. William Smith, Sick Children's Mission and Outings for Crippled Children................	75 00
Brown & Seccomb..............................	10 00
Brown & Seccomb, Summer Charities...............	10 00
Bruce, Miss Matilda W., Sullivan Street School......	722 00
Bruce, Miss Matilda W., Henrietta School...........	720 00
Bruce, Miss Matilda W., Summer Charities..........	150 00
Bruno, C.....................................	20 00
Bruno, C., Fresh Air Fund........................	20 00
Brush, Mrs. C. F., 53d Street School................	5 00
Buell, D. L....................................	2 00
Bugbee, Miss Marcia S., Sick Children's Mission......	5 00
Bulkley, Edwin M..............................	20 00
Burbank, A. N.................................	10 00
Burnside's, Alex. I., four children..................	1 00
Burnside's, Alex. I., four children, Summer Charities..	1 00
Burr, Prof. Wm. H.............................	10 00
Burr, Prof. Wm. H., Summer Charities..............	20 00
Bush Co., Limited, Summer Charities................	50 00
Busche, J. F...................................	2 00
Bussing, A.	5 00
Busy Bee Club, Newsboys' Lodging House...........	12 45
Butler, Arthur W., Summer Charities...............	10 00
Butler, Charles, Summer Charities..................	10 00
Butler, Miss Helen C., Summer Charities............	20 00
Butler, Howard Russell..........................	5 00

Butler, Mrs. Mary R., Summer Charities	$10 00
Butler, Mrs. Mary R., in memoriam William Allen Butler	500 00
Butler, Mrs. Richard, Summer Charities	5 00
Butterworth, George F.	10 00
Butterworth, George F., Summer Charities	5 00
Buttlar, Robert, Summer Charities	25 00
"C. A. R."	1 50
"C. B.," Summer Charities	1 00
"C. L. O."	15 00
"C. L. O.," Italian School	50 00
"C. L. O.," Summer Charities	10 00
"C. S."	100 00
"C. S.," Summer Charities	100 00
"C. W."	10 00
Cadwell, Mrs. E. J.	10 00
Cadwell, Mrs. E. J., Summer Charities	10 00
Cahoon, Mrs. S. M.	2 00
Caldwell, Ben F.	5 00
Caldwell, E., Fresh Air Fund	50 00
Calhoun, Henry W	15 00
Calhoun, Henry W., Summer Charities	10 00
Califf, Maj. Joseph M	5 00
Callaway, S. R., Summer Charities	10 00
Calman, Charles	10 00
Calman, Charles, Summer Charities	20 00
Calman, Henry L.	25 00
Calman, Henry L., Summer Charities	50 00
Campbell, Mrs. George	10
Cammann, E. C	20 00

Cammann, E. C., Newsboys' Lodging House..........	$25 00
Cammann, Miss I. M., Emigration....................	20 00
Camp, Walter	1 00
Cannon, John H..............................	5 00
Cannon, John H., Summer Charities.................	5 00
Cannon, Le Grand B............................	50 00
Cantor, Joseph	5 00
Capen, Frederick M............................	10 00
Capen, Frederick M., Summer Charities..............	25 00
Capstick, Thomas	1 00
Carleton, C.	10 00
Carleton, I. Osgood............................	5 00
Carleton, Miss Ida B...........................	10 00
Carleton, Miss Ida B., Summer Charities............	5 00
Carll, Miss C. J., Mott Street School................	30 00
Carll, Miss C. J., Summer Charities.................	5 00
Carnegie, Mrs. Andrew, Henrietta School............	25 00
Carpender, Alice B., Sick Children's Mission........	10 00
Carpender, C. J., Sick Children's Mission...........	25 00
Carpenter, H. M...............................	5 00
Carpenter, Mrs. Miles B., Summer Charities..........	50 00
Carpenter & Pelton............................	5 00
Carroll, Walter N..............................	5 00
Carter, James C., Summer Charities.................	20 00
Cartwright, H. G..............................	10 00
Cary, A. L., Boys' Lodging Houses..................	10 00
Cary, Mrs. W. F., Fresh Air Fund...................	25 00
Case, J. D..................................	5 00
Cash, Southport, Conn..........................	5 00
Cash, Torrington, Conn.........................	1 00

Cash, "P."	$25 00
Cash, "P." Summer Charities	10 00
Cash, Washington, D. C	1 00
Cash, Traverse City, Mich	1 00
Cash, Greenwich, Conn.	1 00
Cash, Montour Falls, N. Y	1 00
Cash, Blythebourne	1 00
Cash, Deep River, Conn	1 00
Cash, P. O. Order	2 00
Cash, through Chilton Paint Co	5 00
Cash, for Crippled Children	1 00
Cash, Washington, D. C	1 00
Cash, Murray Hill Hotel	1 00
Cash, Summer Charities	5 00
Cash, Summer Charities	1 00
Cash, Summer Charities	1 00
Cash, Summer Charities	1 00
Cash, Summer Charities	1 00
Cash, Summer Charities	1 00
Cash, Summer Charities	1 00
Cash, Summer Charities	1 00
Cash, "S." Summer Charities	15 00
Cash, Morristown, N. J., Summer Charities	20 00
Cash, The Mansfield, Summer Charities	2 00
Cash, postage, Summer Charities	28
Cash, "P. A. P.," Summer Charities	3 00
Cash, July 2, Summer Charities	10 00
Cash, Kaaterskill, N. Y., Summer Charities	1 00
Cash, Grand Central Station, Fresh Air Fund	3 00
Cash, from various sources in different amounts	104 00

Cater, Master Aymar, shoes	$2 00
"Catherine"	25 00
Catlin, W. H.	2 00
Century Co.	10 00
Century Co., Summer Charities (1902)	10 00
Century Co., Summer Charities (1903)	10 00
Chafee, Mrs. Z., Farm School	30 00
Chafee, Mrs. Z., Emigration	20 00
Chamberlin, Emerson	5 00
Chamberlin, Emerson, Summer Charities	5 00
Chandler, C. Q., Emigration	20 00
Chapin, Barton	2 50
Chapin, Mrs. E. A.	5 00
Chapin, Mrs. H. J., Summer Charities	5 00
Chapin, Murray H.	50 00
Chapin, Murray H., Summer Charities	50 00
Chapman, Charles D., Summer Charities	10 00
Chapman, P. T.	1 00
Chappell, F. H., Summer Charities	10 00
Chappell, Mrs., Phelps School	10 00
Chase, Irving H., Summer Charities	3 00
Chatham National Bank	5 00
Chave, William G.	10 00
Chesebrough, Robert A., Summer Charities	10 00
Chickering, John J., Phelps School	10 00
Child, Mrs. L. P., Emigration	20 00
Children of Flatbush, support of bed, Summer Home	30 00
Childs, Mrs. Samuel S.	5 10
Chilton, H. P.	10 00
Chisholm, Hugh J.	10 00

Chisholm, Mrs. Hugh J.	$10 00
Chisholm, Mrs. Hugh J., Summer Charities	10 00
Chisholm, S. H., Summer Charities	10 00
Chisolm, B. Ogden	25 00
Chisolm, B. Ogden, Summer Charities	25 00
Chisolm, Mrs. William E., Fresh Air Fund	100 00
Chittenden, R. L.	10 00
Christ P. E. Church, Christmas Collection	120 89
Christian Endeavor Society, Presbyterian Church of Bordentown, N. J	1 00
Chubb, Hendon, Summer Charities	5 00
Church, George H., Summer Charities	5 00
Churchill, H. R.	5 00
Churchill, Marie M	5 00
Clapp, George S	10 00
Clark, Edward Severin	100 00
Clark, Miss Emily Vernon	5 00
Clark, Miss Emily Vernon, Summer Charities	5 00
Clark, Henry A., Emigration	50 00
Clark, Thomas F., Emigration	20 00
Clark, Thomas F., Summer Charities	10 00
Clarke, Mrs. W. J., Summer Charities	1 00
Clarkson, Augustus L., Summer Charities	10 00
Clarkson, Miss Catharine G	10 00
Clarkson, Miss Catharine G., Summer Charities	10 00
Clarkson, Matthew	25 00
Clarkson, Matthew, Summer Charities	25 00
Clausen, Mrs. Charles J	5 00
Clausen, George U	20 00
Claussen, C. A., Summer Charities	5 00

Clearman, H. D	$10 00
Cleary, W. E	2 00
Cleveland, J. Wray, Emigration	20 00
Cleveland, J. Wray, Summer Charities	10 00
Clinton & Russell	100 00
Close, Miss Frances H	5 00
Close, Miss Frances H., Summer Charities	5 00
Close, Walter H., Summer Charities	25 00
Clyde, William P., Fresh Air Fund	500 00
Clyde, William P., Classes for Crippled Children	100 00
Clyde, Mrs. William P	25 00
Cobb, Sanford E	10 00
Coe, George S., Summer Charities	5 00
Coe, Dr. Henry Clarke	10 00
Coggeshall, M. C., Emigration	20 00
Coit, George M	10 00
Colburn, N. A., Summer Charities	10 00
Cole, E. H	10 00
Cole, E. H., Summer Charities	10 00
Cole, Frederick W., Summer Charities	10 00
Cole, W. W., Summer Charities	25 00
Colgate, Mrs. Richard, Summer Charities	10 00
Colgate, William	50 00
Colgate, William, Summer Charities	30 00
Collection M. E. and Presbyterian Churches, Seneca Castle, N. Y	12 85
Collins, E. B	5 00
Collins, Mrs. P	50 00
Colt, Harris D., Summer Charities	10 00
Colt, Samuel P	10 00

Colwell, Frederick L.	$5 00
Colwell, W. J.	2 00
Compton, O.	10 00
Comstock, Mr. and Mrs. Albert	50 00
Congdon, Horace L.	10 00
Congdon, Horace L., Summer Charities	10 00
Congdon, Louis	10 00
Congdon, Louis, Summer Charities	10 00
Conkling, Miss L. R.	1 00
Conlin, Mrs. Benjamin F., Summer Charities	2 00
Conrad, Mrs. H. V., Summer Charities	5 00
Cook, Charles T.	20 00
Cook, Mrs. Charles T., Summer Charities	25 00
Cook, Henry H.	25 00
Coombe, T. Gorton, Summer Charities	10 00
Cooper, Theodore, Summer Charities	25 00
Cooper & Forman	2 00
Cooper & Forman, Summer Charities	2 00
Corning, Christopher R.	10 00
Corning, Christopher R., Summer Charities	10 00
Corning, Jasper E., Summer Charities	7 00
Coster, Mrs. Charles Henry	5 00
Coster, Mrs. Charles Henry, Summer Charities	50 00
Cotheal, Miss E. H., Christmas	10 00
Cotheal, Miss E. H., Summer Charities	10 00
Cotheal, Miss Elizabeth	5 00
Cottman, N. R., Summer Charities	5 00
Coursen, Frances B	2 00
Cowperthwait, J. H	5 00
Cox, Mrs. Rowland, Jr., Summer Charities	2 00

Cragin, Dr. E. B., 53d Street School................	$5 00
Cram, Miss Charlotte Agatha, Summer Charities.....	50 00
Cram, Miss Charlotte Agatha, Special Summer Charities	10 00
Cram, Mr.	25 00
Crandall, Arthur F. J.............................	2 00
Crane, H. M.....................................	20 00
Crane, J. H......................................	5 00
Crane, Mrs. J. H..................................	5 00
Crary, Jesse D....................................	1 00
Crary, Jesse D., Summer Charities..................	1 00
Cree, Miss Mary W., Summer Charities..............	5 00
Crocker, Mrs. George, Phelps School................	15 00
Crosby, Mrs. Charles, Summer Charities.............	10 00
Crosby, Mrs. Edward N.............................	5 00
Crosby, Mrs. Edward N., Summer Charities..........	5 00
Crosby, Mrs. Everett N., Henrietta School...........	5 00
Crosby, Mrs. Everett N., Summer Charities..........	5 00
Cromwell, John H.................................	20 00
Cromwell, Lincoln	20 00
Cross, Mrs. H. S..................................	5 00
Cross, Miss M. R., Treasurer Avenue B School for Crippled Children	215 00
Crossman, W. H., & Bro., Summer Charities.........	25 00
Crowninshield, Mrs. Louise E. du Pont, Sick Children's Mission	25 00
Cruikshank, William M............................	5 00
Curie, Charles, Sixth Street School.................	10 00
Currer, William J.................................	1 00
Currier, Edward W., Summer Charities..............	5 00

Currier, Edwin A., Summer Charities	$5 00
Curtis, Charles B	50 00
Curtis, Mary A	20 00
Curtis, Mary A., Sick Children's Mission	25 00
Curtis, Warren, Summer Charities	10 00
Cushman, Eric and Allen	10 00
Cushman, H. B., & Co	25 00
Cuthbert, John H	10 00
Cutting, R. Fulton	250 00
Cutting, W. Bayard, Tompkins Square Lodging House	50 00
Cutting, W. Bayard, Elizabeth Home for Girls	32 97
Cutting, W. Bayard, German School	25 00
Cutting, W. Bayard, Phelps School	25 00
Cutting, W. Bayard, Eighty-eighth Street School	50 00
Cutting, W. Bayard, West Side Italian School	60 00
Cutting, W. Bayard, Sixth Street School	50 00
Cutting, W. Bayard, Jones Memorial School	25 00
Cutting, W. Bayard, Summer Charities	100 00
Cutting, Mrs. W. Bayard, East Side School	25 00
Cutting, Mrs. W. Bayard, Rhinelander Kindergarten	20 00
D. Y. N. T. Society, Junior Branch, Henrietta School	1 26
Dalton, F. A	5 00
Dalton, F. A., Summer Charities	5 00
Damrosch, Frank	5 00
Dana, Mrs. A. C., Emigration	20 00
Dana, Miss C. A., Emigration	20 00
Dana, Miss C. A., support of bed, Summer Home	30 00
Dana, Charles	100 00
Dana, F. L	5 00
Dana, Frank, Emigration	2 00

Daniels, Rexford, Summer Charities	$10 00
d'Autremont, Mary	3 00
Davidson, Mrs. M., Summer Charities	10 00
Davies, Mrs. Frederick M	20 00
Davies, William G	10 00
Davies, William G., Summer Charities	5 00
Davis, Benjamin P	250 00
Davis, Benjamin P., Summer Charities	100 00
Davis, Frederic	1 00
Davis, Frederic, Summer Charities	3 00
Davis, Mr. and Mrs. Gherardi	10 00
Davison, Alvah	5 00
Davison, Mrs. Charles A., Sick Children's Mission	20 00
Davison, James	2 00
Day, Mrs. Alice H	20 00
Day, Dr. Edward G., Summer Charities	2 00
Day, Miss Katharine S	25 00
Day, Schuyler E	5 00
Dean, Frank, Summer Charities	10 00
Dean, Mrs. H. H., Henrietta School	5 00
De Camp, J. A., Summer Charities	10 00
de Castro, Nathalie L	5 00
Decker, Charles A., Summer Charities	10 00
Decker, William F., coal	500 00
Decker, William F., Farm School	200 00
Decker, William F., Fresh Air Fund	200 00
de Coppet, Henry	100 00
de Coppet, Henry, Summer Charities	100 00
de Gersdorff, Carl A., Emigration	20 00
de Jonge, Louis, & Co., Summer Charities	10 00

De Klyn, B. F., Emigration	$20 00
De Klyn, B. F., Summer Charities	10 00
"De L."	20 00
Delafield, M. L., Summer Charities	5 00
Delano, Miss Caroline	5 00
Deming, L. C.	5 00
Demorest, William C	10 00
de Navarro, Alfonso	5 00
Derby, Mrs. R. H., West Side School	10 00
Despard, C. L., Jr.	5 00
De Vinne, Theodore L.	5 00
De Vinne, Theodore L., Summer Charities	5 00
De Witt, George G	20 00
De Witt, George G., Summer Charities	20 00
De Witt, Theodore, Summer Charities	25 00
Dexter, Dorothea M.	1 00
Dexter, Mrs. F. B	5 00
Dexter, Mrs. F. B., Summer Charities	5 00
Dey, Anthony	10 00
Dibble, Miss Annie E	5 00
Dibble, Miss Annie E., Summer Charities	10 00
Dick, E. R	30 00
Dick, Mrs. W. B	5 00
Dick, Mrs. W. B., Summer Charities	10 00
Dickie, Edward P	50 00
Dickson, Mrs. Cyrus	20 00
Dickson, Mrs. Cyrus, Summer Charities	25 00
Dietz, Fred.	10 00
Dimock, Mrs. Elizabeth J	50 00
Dimock, Mrs. Elizabeth J., Summer Charities	50 00

Dix, Rev. Morgan	$10 00
Dixon, R.	5 00
Dockstader, Theodore G	50 00
Dockstader, Theodore G., Summer Charities	50 00
Dodd, Allison, Summer Charities	25 00
Dodd, S. C. T	5 00
Dodge, Cleveland H., Forty-fourth Street Lodging-House	12 00
Dodge, Mrs. Cleveland H., East River School	5 35
Dodge, Mrs. Cleveland H., Summer Charities	10 00
Dodge, Rev. D. Stuart, Summer Charities	25 00
Dodge, Francis E	20 00
Dodge, Mrs. George Egleston, Summer Charities	50 00
Dodge, Mrs. William E., Jr	1,500 00
Dodge, Mrs. William E., Jr., Forty-fourth Street Lodging-House	143 77
Dodge, Mrs. William E., Jr., Phelps School	25 00
Dodge, Mrs. William E., Sr	25 00
Dodge, Mrs. William E., Sr., Phelps School	10 00
Dominick, George F	5 00
Donald, Peter	20 00
Donaldson, John J	5 00
Donlan, P. H	25
Douglas, Irving R	2 00
Douglas, James, Summer Charities	50 00
Douglas, Dr. and Mrs. James	50 00
Dow, Mrs. Frederic G	20 00
Dow, Mrs. Frederic G., support of bed, Summer Home	30 00
Dow, Mrs. Maud Furniss, Henrietta School	5 00
Dows, Mrs. David, classes for Crippled Children	100 00

Dows, Mrs. David, Summer Charities	$100 00
Draper, C. A.	5 00
Draper, C. A., Summer Charities	5 00
Drumm, Thomas J., Emigration	20 00
Drumm, Thomas J., Summer Charities	10 00
Drummond Detective Agency	5 00
Duane, James May	45 00
Du Bois, C. D., Summer Charities	10 00
Du Bois, Miss Ethel	5 00
Du Bois, Miss Katharine	50 00
Du Bois, Miss Katharine, Sick Children's Mission	50 00
Du Bois, Mrs. M. B.	5 00
Dudley, H. L.	2 00
Dudley, H. L., Summer Charities	5 00
Duffield, K. G., Emigration	10 00
Duffield, Mrs. S. W., Emigration	10 00
Dulles, William, Jr., Summer Charities	10 00
Dun, Mrs. Robert Graham	20 00
Dun, Mrs. Robert Graham, Summer Charities	25 00
Duncan, Miss I., Fresh Air Fund	1 00
Dunham, Charles A.	20 00
Dunham, Charles A., Farm School	30 00
Dunham, Charles A., Summer Charities	30 00
Dunham, S. S., Summer Charities	1 00
Dunlap, James L.	2 00
Dunning, S. Wright	100 00
du Pont, Henry F., Summer Home	25 00
Duryea & Potter	10 00
Dutcher, Charles Mason	10 00
Dutcher, Charles Mason, Summer Charities	10 00

Dwight, John	$50 00
Dyer, M. M., Summer Home	5 00
"E. R."	100 00
Eagle, Clarence H	5 00
Earle, Mrs. Margaret G	10 00
Earle, Mrs. Margaret G., Summer Charities	10 00
Eaton, Mrs. D. Cady	25 00
Eaton, Mrs. D. Cady, Summer Charities	25 00
Eaton, Cole & Burnham Co., Summer Charities	25 00
Eddy, Mrs. U. D., Summer Charities	5 00
Edey, Mrs. C. L., Summer Charities	15 00
Edgar, Mrs. James A	25 00
Edgar, Mrs. James A., Christmas	10 00
Edgar, Mrs. James A., Summer Charities	25 00
Edmonds, Walter D	10 00
Edmonds, Walter D., Thanksgiving	5 00
Edsall, Henry J., Summer Charities	5 00
Edson, Andrew W	1 00
Edwards, Alfred L., Summer Charities	5 00
Edwards, Duncan, Summer Charities	10 00
Edwards, Miss L. J., East Side School	5 00
Egan, Mrs. D. G., Sullivan Street School	10 00
Ehlers, Dr. Edward C	5 00
Ehrich, J. S	10 00
Eicks, C. H., Summer Charities	10 00
Eidlitz, Mrs. Mathilde	5 00
Eidlitz, Mrs. Mathilde, Summer Charities	5 00
Eidlitz, Otto M	20 00
Eisenmann, G. F., Summer Charities	10 00
Elkus, Abram I., Summer Charities	10 00

Ellingwood, C. H.	$20 00
Ellingwood, C. H., Fresh Air Fund	25 00
Elliott, George L.	5 00
Elliott, George L., Summer Charities	5 00
Elliott, Henry H.	5 00
Elliott, W. P.	5 00
Elliott, W. P., Summer Charities	5 00
Ellis, Mrs. John S	25 00
Ellis, Mrs. John S., Summer Charities	25 00
Ellis, William D.	5 00
Ellis, William D., Emigration	20 00
Ellison, William B., Emigration	20 00
Ellison, William B., Summer Charities	25 00
"Elsie and Eleanor"	10 00
Emerson, W. B.	10 00
Emery, John J., Summer Charities	100 00
Emmet, H. C.	25 00
Emmet, Miss Lydia F., Summer Charities	10 00
Emmons, Arthur B., Summer Charities	25 00
Emmons, Mrs. Charles P., Emigration	20 00
Emmons, Mrs. Charles P., Summer Charities	20 00
Erbsloh, Rudolph	10 00
Erbsloh, Rudolph, Summer Charities	5 00
Estate of Samuel D. Babcock, Bequest	4,762 50
Estate of Sarah Bayly, Bequest	1,965 05
Estate of Andrew J. Garvey, Bequest	748 59
Estate of John P. Hamilton, Bequest	175 00
Estate of Susan Miln, Bequest	110,323 53
Estate of Phebe Ann Parshall, Bequest	98 31
Estate of Cornelia B. Tompkins, Bequest	9,500 00

Estate of Mary J. Walker, Bequest	$24,193 77
Estate of Henrietta A. Webb, Bequest	475 00
Estate of Theodore G. Weil, Bequest	950 00
Estelow, Jared C., Summer Charities	1 00
Eustis, Mrs. William, Emigration	20 00
Evans, Hartman K., Summer Charities	50 00
Evans, John S	10 00
Evans, John S., Summer Charities	10 00
Evans, Richard	5 00
Evans, Richard, Summer Charities	10 00
Evans, Richard V	1 50
Evans, William, Jr	5 00
Everman, John, Jr.	10 00
Everman, Marguerite	10 00
"F. A. H."	4 00
"F. A. H.," Summer Charities	2 00
"F. G."	50 00
"F. G.," Summer Charities	200 00
"F. R. S."	1 00
"F. S."	50 00
"F. S.," Summer Charities	25 00
"F. W. D.," Summer Charities	25 00
Fabbri, Mrs. Egisto P	100 00
Fabbri, Mrs. Egisto P., hot meals, Italian School	400 00
Fabbri, Mrs. Egisto P., special donation, Italian School	50 00
Fabbri, Mrs. Ernesto G., support of bed, Summer Home	30 00
Faber, A. W., Summer Charities	10 00
Fagnani, Rev. Charles P	3 00

Fahnestock, H. C.	$100 00
Fairbanks, Miss Mary, birthday gift, Fresh Air Fund	10 00
Fairbanks, Miss Mary and Helen Ethel Gordon, Fresh Air Fund	2 75
Fairchild Bros. & Foster	10 00
Fairchild Bros. & Foster, Summer Charities	10 00
Fareira, M. B	1 00
Fareira, M. B., Summer Charities	1 00
Farmer, William H	10 00
Farnham, Mrs. H. P	10 00
Farrar, George D., Summer Charities	25 00
Farrel, John	10 00
Fassett, Mrs. J. S., Summer Charities	25 00
Fawcett, Hughes	5 00
Fenton, W. B., Summer Charities	3 00
Ferguson, Mrs. Farquhar	10 00
Ferris, Franklin	5 00
Field, Warren B	2 00
Fink, Joseph H	5 00
Fink, Martin D., Summer Charities	10 00
First Congregational Church, Montclair, N. J., Emigration	20 00
Fischer, Carl	10 00
Fisher, J. E	5 00
Fisk, George Robert	2 00
Fiske, George P., Summer Charities	5 00
Fiske, Robert T. P	5 00
Flammer, J. George	20 00
Flammer's, Mrs. C., two boys, Henrietta School	5 00
Fleischmann's Vienna Model Bakery	5 00

Fletcher, Isaac D	$5 00
Fliess, William M., Newsboys Christmas Dinner	207 15
"Florence," through N. Y. Times, Sick Children's Fund	1 00
Flower, A. R.	30 00
Flower, Mrs. John D	10 00
Flower, Miss Mary A	10 00
Fogg, H. A	5 00
Fonda, W. C.	2 00
Foote, Dr. E. B	5 00
Foote, Dr. E. B., Fresh Air Fund	5 00
Foote, Thomas H	1 00
Forbes, David	50 00
Forbes, David, Summer Charities	30 00
Fords, Howard & Hulbert	5 00
Fords, Howard & Hulbert, Summer Charities	5 00
Forsyth, G. W	25 00
Foster, Abbott, Summer Charities	10 00
Foster, Edward H	10 00
Foster, J. Hegeman	20 00
Foster, J. Hegeman, Summer Charities	10 00
Foster, James	5 00
Fountain, E. M. C., Fresh Air Fund	5 00
Fox, Irving J	2 00
Fox, Mrs. Rector, Summer Charities	10 00
Fraenckel, Richard H	15 00
France, George	2 00
Francis, E. E., Summer Charities	5 00
Frank, Paul	30 00
Fraser, Alex. W	5 00

Fraser, Alex W., Summer Charities................	$10 00
Frazier, Miss Annie..............................	5 00
Frazier, Miss Annie, Sick Children's Mission.........	10 00
Freeman, E. B................................	5 00
Freeman, Joel Francis, Summer Charities...........	10 00
French, Edgar B................................	2 00
French, Edgar B., Summer Charities................	2 00
French, James B................................	5 00
French, Mrs. Margaret H., Emigration................	20 00
Frew, Walter E., Summer Charities.................	25 00
Friedman, S. A................................	2 00
"Friend"	5 35
"Friends," C. S. S.............................	100 00
"Friends," per Mrs. Seymour.......................	10 00
"Friends," Christmas, 53d Street School.............	4 00
Frissell, A. S., Summer Charities....................	10 00
From a Friend, through Dr. Wheelock, for wagonette.	775 00
Friend, December 22..............................	1 00
Froment & Co., Summer Charities..................	10 00
Frost, Edward L................................	30 00
Frothingham, H. P.............................	10 00
Fuller, Mrs. Eugene, Summer Charities..............	5 00
Furber, J. B....................................	10 00
"G. B. J.," Summer Charities......................	25 00
"G. McC. and G. B. J.," Emigration................	20 00
Gallatin, Mrs. A. H., Emigration....................	20 00
Gallaway, Robert M.............................	25 00
Gambier, E. V.................................	5 00
Gambier, E. V., Summer Charities..................	5 00
Gammell, Mrs. Robert Ives, Summer Charities........	25 00

Garrettson, Francis T.	$10 00
Garrigues, W. A.	10 00
Garrigues, W. A., Summer Charities	10 00
Garrison, C. M., Emigration	20 00
Gault, John	10 00
Gault, John, Summer Charities	10 00
Gaunt, J.	25 00
Gayley, O. C., Summer Charities	10 00
Geer, Mrs. Walter, Summer Charities	25 00
Gentle, Mrs. J., 53d Street School	5 00
Gentle, Miss Janet, 53d Street School	2 00
George, E. P., Summer Charities	20 00
Gerry, Elbridge T., Fresh Air Fund	100 00
Gerry, Mrs. Elbridge T., in memoriam Robet J. Livingston	2,000 00
"Gertrude and Joe," Summer Charities	5 00
Gibson, Robert W.	10 00
Gibson, Robert W., Summer Charities	10 00
Giffing, John C.	5 00
Gilbert, Walter R.	15 00
Gilbert, Walter R., Summer Charities	15 00
Girls' Friendly Society and Grammar School pupils of Clarke School	27 31
Goddard, A. E.	5 00
Goddard, Miss Madeline Ives, Emigration	20 00
Goepel, C. F. & Co.	10 00
Goertz, H. P.	4 00
Goffe, R. H., Jr.	5 00
Goodwin, James J.	25 00
Goodwin, Mrs. James J.	25 00

Gordon, Robert, Summer Charities	$50 00
Gorton, Carrie F., Emigration	40 00
Gorton, Charles W., Emigration	20 00
Gossler, Gustav H	2 00
Gossler, Gustav H., Summer Charities	5 00
Gouldrup, John A	5 00
Grace Allen Fund	2 00
Gracie, James K., Summer Charities	25 00
Gracie, James K., West Side Italian School	10 00
Graham, Mrs. John, Summer Charities	6 00
Graham's, The Misses, School, part of class collection, Fresh Air Fund	9 64
Granniss, George H., Summer Charities	10 00
Grant, John H., Summer Charities	5 00
Graves, Arthur B	20 00
Graves, Rufus R	20 00
Gray, A. F	3 00
Gray, A. F., Summer Charities	3 00
Greeff, Bernhard	100 00
Green, James W	25 00
Green, James W., Summer Charities	25 00
Greene, G. S., Jr., Sullivan Street School	5 00
Greene, Miss Mary A., clothing	5 00
Greenleaf, Miss E. M., Thanksgiving	2 00
Greenleaf, Miss E. M., Sick Children's Mission	2 50
Greenwood, Isaac J	25 00
Griffin, Mrs. William Preston	5 00
Griffin, Mrs. William Preston, Fresh Air Fund	5 00
Griggs, Herbert L., Summer Charities	50 00
Griggs, T. A., Summer Charities	5 00

Grismer, Joseph R	$5 00
Griswold, Mrs. L. A	5 00
Griswold, Lorenzo	2 00
Guggenheimer, Randolph, Newsboys' Dinner	103 85
Guinzburg, Mrs. H. A., Sick Children's Fund	10 00
Guinzburg, Mrs. H. A., Summer Charities	5 00
Guinzburg, Mrs. Victor, Summer Charities	10 00
Gulliver, Mrs. W. C	5 00
Gurnee, A. C., Summer Charities	20 00
Gurnee, A. C., Emigration	20 00
Gurnee, W. S., Summer Charities	50 00
Guttzeit, F. P	3 00
Gwalter, Henry L., Summer Charities	20 00
Gwalter, Miss Ivy, Summer Charities	1 50
Gwalter, Mrs. Lucy, Summer Charities	3 50
"H. G. K."	50 00
"H. G. K.," Summer Charities	30 00
"H. H. H."	5 00
"H. J."	1 00
"H. K. E."	50 00
"H. S."	5 00
"H. S. S.," Fresh Air Fund, Boys' Farm	25 00
Hadden, Mrs. John A., Jr., West Side School	25 00
Hadley, B.	1 00
Hage, Daniel S	5 00
Hague, James D	15 00
Hague, James D., Summer Charities	5 00
Haines, Henry F., Fresh Air Fund	25 00
Hall, Master Clifford A	1 00
Hall, Edward E., Summer Charities	5 00

Hall, Henry L., Summer Charities	$5 00
Hall, Richard	10 00
Hall, Thomas R. A.	10 00
Hall, Thomas R. A., Summer Charities	10 00
Hallgarten, Charles L.	100 00
Halsey, Charles D., Summer Charities	10 00
Halsey, George A.	1 00
Halsted, Miss A. B.	10 00
Halsted, Miss A. B., Thanksgiving	5 00
Halsted, Miss A. B., Summer Charities	30 00
Halsted, Miss M. M.	10 00
Halsted, Miss M. M., Summer Charities	25 00
Hambler, W. H., Summer Charities	2 00
Hamersley, Mrs. J. Hooker, Sullivan Street School	37 60
Hamersley, Mrs. J. Hooker, Newsboys' Lodging-House	59 88
Hamersley, Mrs. J. Hooker, Summer Home	100 00
Hamersley, Mrs. J. Hooker, Sick Children's Mission	100 00
Hamilton, J. H.	2 00
Hamilton, Mrs. William Pierson	15 00
Hamilton, Schuyler, Jr., Summer Charities	25 00
Hammond, John Henry	5 00
Harding, Philip W.	10 00
Hare, J. Montgomery, Summer Charities	10 00
Harkness, Charles W., Summer Charities	50 00
Harkness, Edward S.	50 00
Harkness, Edward S., Summer Charities	50 00
Harkness, Mrs. S. V.	50 00
Harkness, Mrs. S. V., Summer Charities	50 00
Harkness, Mrs. William L.	100 00
Harkness, Mrs. William L., Summer Charities	100 00

Harmon, W. E., Emigration	$320 00
Harmon, W. E., Sick Children's Mission	10 00
"Harold and Marion"	5 00
Harper, Mrs. Henry S., Haxtun Cottage for Crippled Children	50 00
Harrah, Charles J	100 00
Harrah, Charles J., Summer Charities	100 00
Harrington, Amos T	1 00
Harris, George M., Emigration	20 00
Harris, N. W., & Co	25 00
Harris, Mrs. William Hamilton	10 00
Harris, Rev. William R	1 00
Harrison, Mrs. M. L	40 00
Harrison, Mrs. M. L., Summer Charities	10 00
Hart, Henry	10 00
Hart, Henry, Summer Charities	10 00
Hart, William Howard	10 00
Hart, William Howard, Fresh Air Fund	20 00
Hartshorne, Mrs. R. B	10 00
Harvey, Mrs., Health Home	1 00
Harvey & Outerbridge	5 00
Hastings, Rev. Thomas S	5 00
Hathaway, Charles, Summer Charities	25 00
Hauselt, Charles E	20 00
Haven, Mrs. George G., Summer Charities	100 00
Haven, J. Woodward, Summer Charities	25 00
Haviland & Abbot	5 00
Hayden, Mrs. H. J	10 00
Hayden, Mrs. H. J., Summer Charities	10 00
Hayes, Bert and Howard	10 00

Haynes, W. de F., Summer Charities	$10 00
Hearn, James A., & Son, Summer Charities	25 00
Heaton, H.	10 00
Heinze, Otto, & Co., Summer Charities	10 00
Heller, Hirsh & Co	2 00
Heller, Hirsh & Co., Summer Charities	3 00
Hellman, Edgar A., Summer Charities	10 00
Hellyer, H. A. C	5 00
Hellyer, H. A. C., Summer Charities	10 00
Hencken, George D., Farm School	5 00
Hencken & Willenbrock	25 00
Henderson, Miss M. W., Summer Charities	5 00
Henriques, C. A	5 00
Henry, H. G	5 00
Henry, William	10 00
Hepburn, A. B., Henrietta School	30 00
Herbert, H. G	1 10
Herrick, Mrs. Everett	20 00
Herrick, Mrs. Everett, Summer Charities	30 00
Hermann, Ferd., Summer Charities	50 00
Herrmann, Mrs. Esther, Summer Charities	25 00
Hersey, A. T	1 50
Hewson, J. H., Summer Charities	25 00
Heyé, Mrs. Gustav	50 00
Heyé, Mrs. Gustav, Summer Charities	50 00
Hickman, William C., Summer Charities	1 00
Hicks, B. F	3 00
Hieronymus, B. R	1 00
Higgens, J. E. G	10 00
Higgens, J. E. G., Summer Charities	15 00

Higginson, Miss Dorothy Lee, Fresh Air Fund	$30 00
Higginson, James J	50 00
Higginson, James J., Summer Charities	50 00
Hill, Fritz	10 00
Hill, William S., Summer Charities	2 00
Hills, Miss Clarissa	5 00
Hills, Miss Clarissa, Summer Charities	2 00
Hinchman, Walter	25 00
Hind, James F	40 00
Hind, James F., May 15, 1903	15 00
Hine, C. G	5 00
Hinman, William K	10 00
Hinman, William K., Summer Charities	10 00
Hitch, Mrs. Frederic Delano, Summer Charities	20 00
Hitchcock, H. M	2 00
Hoe, R., & Co	50 00
Hoffmann, Walter	10 00
Hoffmann, Walter, Summer Charities	10 00
Hogan, Charles W., Summer Charities	100 00
Hogan, Jefferson, Summer Charities	100 00
Holden, James C	5 00
Holden, James C., Summer Charities	5 00
Holder, Dr. and Mrs. James P	5 00
Holley, B. E., Summer Charities	5 00
Holmes, Anthony D., Newsboys' Lodging-House	2 00
Holmes, Edwin T., Jr., Emigration	10 00
Holmes, Ernest R	5 00
Holmes, Mrs. Mary J., Summer Charities	10 00
Holmes, Mildred, Emigration	10 00
Holmes Bros	20 00

Holstein, Ia., Savings Bank	$1 00
Holt, Mrs. L. M., Henrietta School	10 00
Hopf, M. G., Haxtun Cottage for Crippled Children	5 00
Hopkins, Augusta D., Summer Charities	10 00
Hopkins, H. C., Emigration	20 00
Hopkins, Woolsey R	10 00
Hopkins, Woolsey R., Summer Charities	5 00
Hoppin, G. Beekman	5 00
Hornblower, W. B	10 00
Hornblower, W. B., Summer Charities	10 00
Horstmann, Von Hein & Co	5 00
Horstmann, Von Hein & Co., Summer Charities	5 00
Horton, C. E	10 00
Hotchkiss, Dr. Lucius W	10 00
Hothorn, E. G	3 00
Houghton, Frank R., Thanksgiving	10 00
Howard, Joseph, Jr., Emigration	20 00
Howe, George M., Summer Charities	10 00
Howe, Dr. J. Morgan, Summer Charities	25 00
Howe, Samuel	5 00
Howell, William P	1 00
Howells, Frank S	10 00
Howells, George A	1 00
Howells, Mrs. Sarah Lord, Lord Memorial School	100 00
Howland, Emily	10 00
Howland, Emily, Summer Charities	5 00
Howland, Mrs. Henry, West Side School	5 00
Hoyt, Mrs. Colgate, Summer Charities	10 00
Hoyt, Edwin C	10 00
Hoyt, Dr. Ezra P., Fifty-third Street School	15 00

Hoyt, Miss G. L., Summer Charities	$5 00
Hoyt, Miss Gertrude Riker	10 00
Hoyt, Mrs. James Otis	25 00
Hoyt, Mrs. Louis T., Summer Charities	10 00
Hoyt, Mrs. Oliver	25 00
Hoyt, Winfield S., Summer Charities	25 00
Hubbard, Mrs. E. K	5 00
Hubbard, T. S	10 00
Hubbard, T. S., Fresh Air Fund	10 00
Hubbard, Thomas H	25 00
Hubbard, Thomas H., Summer Charities	50 00
"Hudson," Summer Charities	100 00
Huendling, L.	1 00
Humphreys, Alexander C.	10 00
Humphreys, George H., Summer Charities	10 00
Hunter, Arthur	10 00
Hunton, M. D	5 00
Hunton, M. D., Summer Charities	5 00
Hurlbut, Pierre P., Summer Charities	5 00
Hurley, Thomas J	2 00
Hyde, A. Fillmore	10 00
Hyde, Mrs. A. Fillmore	5 00
Hyde, Clarence M	500 00
Hyde, Clarence, M., Summer Charities	250 00
Hyde, Clarence M., Christmas	100 00
Hyde, Mrs. H. B	30 00
Hyde's, J. E. Hindon, Little Son, Emigration	20 00
Hyman, Mrs. D. M., Summer Charities	15 00
"I. P. H."	1 00
"I. P. H.," Summer Charities	1 00

Imanuel Church, Westerleigh, S. I.	$15 00
"In Memoriam"	30 00
"In Memoriam, A. F. B., June 18, 1900"	21 00
"In Memoriam, A. F. B., June 18, 1900," Fresh Air Fund	7 50
"In Memoriam, Alfred Roe," by his Daughter, Mrs. S. M. Cory, Emigration	20 00
"In Memoriam, B. N. G.," Summer Charities	5 00
"In Memoriam, F. M. Monroe," Health Home	25 00
"In Memoriam, G. O., Jr., Dec. 16th"	37 00
"In Memoriam, James Hervey Sanford"	100 00
"In Memoriam, James Hervey Sanford," Summer Charities	50 00
"In Memoriam, L. M. H."	20 00
"In Memory of F. A. B."	5 00
"In Memory of F. C. C.," Fresh Air Fund	10 00
"In Memory of F. M. M."	25 00
"In Memory of George Pierpont Woolsey," Emigration	20 00
"In Memory of John H. Kemp," Summer Charities	5 00
"In Memory of John W. Skinner"	25 00
"In Memory of Lawrie," Summer Charities	25 00
"In Memory of little Ernst"	25 00
"In Memory of little Herman," Fresh Air Fund	10 00
"In Memory of Mabel"	5 00
"In Memory of Millicent"	1 00
"In Memory of W. M. H."	30 00
Ingersoll, A. N.	26
Ingram, Mrs. James, Sick Children's Mission	3 00
Inslee, Miss Eliza	10 00

Inslee, Mrs. Samuel, Haxtun Cottage for Crippled Children	$30 00
Inslee, Mrs. Samuel, 53d Street School	5 00
Institute for Improved Instruction of Deaf Mutes, Fresh Air Fund	100 00
Iredell, Ellen H	10 00
Iredell, Mrs. F. W	15 00
Iredell, Frances and Eleanor	10 00
"Irene and Waldemar," Christmas	10 00
"Irene, Waldemar and Eleanor," Fresh Air Fund	10 00
Iselin, Adrian	500 00
Isham, Miss Flora	25 00
Isham, William B., Summer Charities	50 00
Italian Government Subsidy, Italian School	753 61
Ives, Frederick D., classes for Crippled Children	20 00
Ives, Frederick D., Summer Charities	30 00
"J."	5 00
"J. B.," Summer Charities	15 00
"J. D."	20 00
"J. D.," Summer Charities	20 00
"J. D. W.," Emigration	40 00
"J. D. W.," Summer Charities	5 00
"J. H. J."	5 00
"J. H. J.," Summer Charities	5 00
"J. K. C. and W. H. B."	10 00
"J. V. V. B."	10 00
J. W.	3 00
Jackson, E. E., Summer Home	100 00
Jackson, Oswald, Summer Charities	10 00
Jackson, R. C., Summer Charities	2 00

Jackson, Theodore F., Summer Charities	$10 00
Jackson, Mrs. W. H	10 00
Jackson, Mrs. W. H., Summer Charities	10 00
Jacobi, Dr. A	20 00
Jacobs, Milton K	5 00
Jacobs, Rosalie M	5 00
James, Arthur Curtiss, Manual Training	1,500 00
James, Arthur Curtiss, Fresh Air Fund	100 00
James, D. Willis, Tompkins Square School	596 75
James, D. Willis, West Side Italian School	50 00
James, D. Willis, Sixth St. School	20 00
James, D. Willis, Tompkins Square Lodging House	113 23
James, D. Willis, Emigration	1,200 00
James, D. Willis, special donations	400 00
James, Mrs. D. Willis, Mott St. School	300 00
James, Mrs. D. Willis, Mott St. School	286 21
James, Mrs. D. Willis, West Side Italian School	296 77
James, William S	5 00
Jay, Miss Cornelia, Summer Charities	5 00
Jenkins, A. B	50 00
Jenkins, A. B., Summer Charities	25 00
Jenkins, A. W	5 00
Jenkins, A. W., Summer Charities	10 00
Jennings, E. A	10 00
Jennings, J. W	3 00
Jesup, Morris K	100 00
Jesup, Morris K., Lord School	50 00
Jewett, W. K., Summer Charities	10 00
Jockson, J. W	2 00
"Joe, Marion and Dick."	30 00

Johnes, Mrs. E. R., Summer Charities	$5 00
Johnson, Miss E. W., Duane St. School	5 00
Johnson, F. Coit, Summer Charities	10 00
Johnson, Frederick, Emigration	40 00
Johnson, Frederick, Fresh Air Fund	10 00
Johnson, James G	10 00
Jonas, L. A.	3 00
Jones, Mrs. A. H	5 00
Jones, Mrs. A. H., Summer Charities	10 00
Jones, B. M. & Co	5 00
Jones, C. H.	5 00
Jones, Miss Caroline Ogden	5 00
Jones, H. Bolton	10 00
Jones, R. W., Jr	5 00
Jones, R. W., Jr., Summer Charities	5 00
Jones, W. S.	10 00
Jones, W. S., Summer Charities	5 00
Jones, William E.	5 00
Josselyn, Edgar A., Summer Charities	5 00
Judd, Miss H. B	5 00
Judd, Miss H. B., Summer Charities	7 00
Judson, Henry I	25 00
Judson, Henry I., Summer Charities	25 00
Jung, Charles R., Summer Charities	5 00
Junior C. E. Society, First Presbyterian Church, Carbondale, Pa	5 00
Junior C. E. Society, Steinway Reformed Church	5 00
Junior C. E. Society, East Long Hill, Middletown, Conn., Emigration	10 00

Junior C. E. Society, New Utrecht Reformed Church, Summer Home	$11 00
"K."	25 00
"K.," Fresh Air Fund	20 00
Kahn, Isidor, Summer Charities	5 00
Kahn, O. H	25 00
Kahn, O. H., July 18	100 00
Kahn, O. H. Summer Charities	30 00
Kane, Mrs. John Innes, Summer Home	35 00
Kaskel & Kaskel, Summer Charities	5 00
Kaufman, Mrs. J. H., Fresh Air Fund	5 00
Keith, C. H	3 00
Keith, C. H., Summer Charities	5 00
Kellogg, Mrs. Charles	10 00
Kellogg, Mrs. Charles, Summer Charities	10 00
Kellogg, Charles D	10 00
Kellogg, Herbert S	2 00
Kelsey, C H., Emigration	20 00
Kelsey, Mrs. C. H	20 00
Kelsey, Frederick W	5 00
Kelso, G. Radford, Summer Charities	10 00
Kemmerer, M. S	10 00
Kemp, Mrs. John H	5 00
Kennedy, John S	100 00
Kennedy, John S., Summer Charities	100 00
Kent, William	5 00
Keppleman, Adolphus	5 00
Keppler, Rudolph	5 00
Keppler, Rudolph, Summer Charities	5 00

Keppler & Schwarzmann, "Puck"	$50 00
Kerndt, Moritz	2 00
Kernochan, Mrs. J. Frederic	10 00
Kerr, Walter C	10 00
Kerr, Mrs. Walter C., Haxtun Cottage for Crippled Children	10 00
Keteltas, Miss Alice	15 00
Keteltas, Miss Alice, Summer Charities	50 00
Ketchum, Janet	25
Keyser, Samuel	25 00
Kidder, A. M. & Co	25 00
Kilborne, A. W	100 00
Kilborne, R. S., Summer Charities	10 00
Kimball, Charles E., Summer Charities	10 00
King, Miss Ellen, Thanksgiving	50 00
King, Miss Ellen, Fresh Air Fund	50 00
King, Mrs. Le Roy	20 00
King, Miss Mary Le Roy, Summer Charities	100 00
King, Miss Mary Le Roy, hot dinners and shoes	50 00
King, Miss Mary Le Roy, Farm School	30 00
King, Miss Mary Le Roy, Emigration	20 00
Kingsland, Mrs. A. C	25 00
Kip, George G	150 00
Kip, George G., Sick Children's Mission	75 00
Kip, George G., Health Home	50 00
Kip, George G., Summer Home	25 00
Kip, Henry S	20 00
Kip, Dr. Isaac L	50 00
Kip, Dr. Isaac L., Summer Charities	25 00
Kirtland, G. S	5 00

Kissam, S. H.	$75 00
Kisell, Gustav E.	100 00
Kisell, Gustav E., Special Donation	50 00
Kisell, Gustav E., West Side Italian School	10 00
Klaber Boys	5 00
Knapp, Mrs. A. G., Summer Home	5 00
Knapp, J. E., Summer Charities	1 00
Knauth, Antonio	5 00
Knox, George L., Emigration	20 00
Knox, William K.	2 00
Kobbé, Frederick	5 00
Kobbé, Frederick, Summer Charities	5 00
Koechl, Paul and Otto	50 00
Koechl, Victor, Summer Charities	25 00
Kunhardt, Master Kingsley, Emigration	20 00
"L. G. A."	2 00
"L. R."	10 00
"L. R.," Summer Charities	10 00
"L. S. P.," Emigration	20 00
Ladies of West Point, Proceeds of Sale, Fresh Air Fund	365 77
Laidlaw, C. E., Summer Charities	10 00
Landon, Francis G., Summer Charities	25 00
Lane, Mrs. Wolcott G., Summer Charities	5 00
Langdon, C. H.	10 00
Langdon, Woodbury G., Summer Charities	25 00
Langford, Charles W.	10 00
Langton, John	50 00
Langton, John, Summer Charities	50 00
Lanier, Mrs. M. M.	10 00

Lanier, Mrs. M. M., Summer Charities	$100 00
Lansing, Mrs. A. B., Summer Charities	15 00
Lapsley, Howard	10 00
Lapsley, Miss	2 00
Larned, E. C.	5 00
Larned, E. C., Summer Charities	5 00
Larocque, Joseph	25 00
Larocque, Joseph, Tompkins Square Lodging House	25 00
Lawrence, Cyrus J., Summer Charities	10 00
Lawrence, Cyrus J., East Side School	5 00
Lawrence, Frank R.	25 00
Lawrence, John Burling	10 00
Lawrence, Mrs. John Burling, hot meals	180 00
Lawrence, Mrs. John Burling, Emigration	20 00
Lawrence, Mrs. John Burling, support of 2 beds, Summer Home	60 00
Lawrence, John L., Summer Charities	100 00
Lawrence, Mrs. Samuel	35 00
Lawrence, Mrs. Samuel, Summer Home	15 00
Lawrence, Mrs. Samuel, Sick Children's Mission	10 00
Lawson, W	2 50
Lawson, W. S. & Co.	100 00
Ledyard, L. C., Phelps School	50 00
Lee, B. F., Emigration	20 00
Lee, Ethel McLane, Emigration	10 00
Lee, Katharine Lawrence, Emigration	10 00
Lee, W. H. L., Summer Charities	20 00
Lee, Kretchmar & Co.	10 00
Lee, Kretchmar & Co., Summer Charities	30 00
Leeb, Alfred	10 00

Leeb, Alfred, Summer Charities	$5 00
Lehmaier, James M., Summer Charities	10 00
Lehman, Emanuel, Summer Charities	25 00
Leissner, Eduard	3 00
Lent, William D	20 00
Lent, William D., Summer Charities	10 00
Leonard, George L., Summer Charities	2 00
Leonard, M. H	5 00
Leonard, M. H., Summer Charities	5 00
Leonard, T. M	5 00
Le Roy, Edward A., III	5 00
Lesher, Whitman & Co	5 00
"Lest I Forget"	25
Leverich, Miss Eliza J., Christmas	10 00
Leverich, Miss Eliza J., Thanksgiving	5 00
Leverich, Miss Eliza J., Fresh Air Fund	10 00
Levino, H. D., Summer Charities	25 00
Lewis, R. V	10 00
Lewis, R. V., Summer Charities	10 00
Libbey, O. B	10 00
Linen Thread Co	10 00
Lisa Day Nursery (1902) Fresh Air Fund	50 00
Litchfield, R. S	5 00
Littlejohn, Mrs. F. B., coal	2 00
Littlejohn, Mrs. F. B., Christmas	2 00
Littlejohn, Mrs. F. B., Summer Charities	5 00
Livingston, Mrs. H. T., Christmas	5 00
Livingston, John Henry, Farm School	30 00
Livingston, John Henry, Summer Charities	25 00
Livingston, Miss Julia, West Side School	31 00

Livingston, Miss Julia, Summer Charities............	$10 00
Livingston, Mrs. Maturin, Emigration..............	450 00
Livingston, Mrs. Maturin, Summer Home and Sick Children's Mission	100 00
Livingston, Mrs. Maturin, Christmas...............	50 00
Livingston, Mrs. R. E., Summer Charities............	20 00
Lobenstine, William C., Emigration................	20 00
Lobenstine, William C., Summer Charities..........	15 00
Locke & Altherr................................	10 00
Lockman, John T., Summer Charities................	25 00
Lockwood, Mrs. F. W............................	5 00
Lockwood, Mrs. F. W., Summer Charities............	10 00
Loeb, Gustav	5 00
Loney, Miss Virginia Bruce........................	10 00
Loomis, Charles Battell, coal......................	10 00
Loomis, Carles Battell, Summer Charities............	5 00
Lord, Franklin B., Lord Memorial School............	200 00
Lord, Mrs. George de Forest, Lord Memorial School (1902)	350 00
Lord, Mrs. George de Forest, Lord Memorial School, Christmas	100 00
Lord, Mrs. George de Forest, Summer Charities......	25 00
Lord, Henry, Summer Charities.....................	100 00
Lord, Mrs. Martha M............................	10 00
Lord, Mrs. Martha M., Summer Charities............	10 00
Lord & Taylor, Summer Charities..................	25 00
Lorton, Mrs. Heth, Summer Charities................	25 00
Lothrop, C.....................................	5 00
"Louise, Charlie, Willie and Hattie," Summer Charities	20 00

Lovell, Rev. John G. and friends	$13 75
Lovell, Rev. John G. and sister	6 00
Low, C. Adolphe, coal	50 00
Low, C. Adolphe, Summer Charities	50 00
Low, Hon. Seth	25 00
Low, Hon. Seth, Summer Charities	50 00
Lowrie, Mrs. Walter, Emigration	20 00
Lozier, T. F	5 00
Ludlam, George P	10 00
Ludlow, Edward L., Summer Charities	10 00
Ludlow, William O	1 00
Ludlum, E. F	5 00
Lueders, George & Co., Summer Charities	5 00
Lunger, John B	5 00
Lusk, Dr. William C	5 00
Lusk, Dr. Wiliam C., Summer Charities	10 00
Lydig, David, Emigration	25 00
Lydig, David, Summer Charities	25 00
Lyle, John S	100 00
Lyman, Samuel H., Summer Charities	10 00
"Lyman, Ellen, Laura, Jean and Sara"	25 00
McAlan, Alida	5 00
McAlpin, Charles W., Summer Charities	100 00
McAlpin, George L	5 00
McAlpin, George L., Summer Charities	15 00
McAlpin, William W., Emigration	20 00
McCagg, Louis B., Summer Charities	25 00
McCagg, Mr. and Mrs. Louis B	50 00
McColl, Miss Bessie, Fresh Air Fund	10 00
McCord, W. H	25 00

McCord, W. H., Summer Charities	$25 00
McCreery, Mrs. James	5 00
McCreery, Mrs. James, Summer Charities	10 00
McCullagh, John H	30 00
McCune, Miss, Fresh Air Fund	1 00
McCurdy, Robert H., Summer Charities	20 00
McCutchen, C. W., Summer Charities	10 00
McDonald, T. D	2 00
McDonald, T. D., Summer Charities	2 00
McHarg, Henry K., Summer Charities	100 00
McIlvain, D. H	2 00
McInnes, D	1 00
McIntyre, Miss Edith C	1 00
McKenna, David	2 00
McKenna, David, Summer Charities	2 00
McKim, Robert V	10 00
McKim, Robert V., Summer Charities	10 00
McLane, Guy R., Summer Charities	10 00
McLean, James	50 00
McLean, John S., Summer Charities	25 00
McManus, Wm. B., Health Home	5 00
McRae, Miss, Baby Mission	1 00
"M. A.," Fresh Air Fund	2 00
"M. H. A."	250 00
"M. M."	10 00
Mabon, James B	20 00
Mabon, James B., Summer Charities	25 00
Mabon, Mrs. James B., Phelps School	10 00
Mabon, S. Cliffton	5 00
Mabon, S. Cliffton, Summer Charities	5 00

Macbeth, William	$3 00
Macbeth, William, Summer Charities	5 00
Mackay, Arch. K	5 00
Mackay, Arch. K., Summer Charities	5 00
Mackay, Donald	25 00
Maclaren, D. L. S., Summer Charities	10 00
MacLaren, Master Duncan	5 00
MacLaren, Mrs. F	50 00
MacLaren, Mrs. F., Fresh Air Fund	50 00
MacMartin, Malcolm, Summer Charities	10 00
Macy, Mrs. V. Everit, Classes for Crippled Children	10 00
Mager, Mrs. F. Robert	5 00
Mager, Mrs. F. Robert, Summer Charities	10 00
Major, Alphonse, Summer Charities	1 00
Mansfield, Howard, Summer Charities	5 00
Marcellus, Henry L	1 00
March, Clement, Newsboys' Lodging House	300 00
Mariners' Harbor Baptist Church	5 00
Marre, Mrs. Andrew, Summer Charities	5 00
Marshall, Charles H	25 00
Marshall, Charles H., Summer Charities	25 00
Marshall, Mrs. E. C	25 00
Marshall, Mrs. E. C., Summer Charities	30 00
Martin, J. M	5 00
Martin, Miss Myra B	20 00
Martin, Thomas Commerford	10 00
Martin, Thomas Commerford, Summer Charities	5 00
Martin, W. M	25 00
Martin, Wm. V., Summer Charities	3 00
Martinez, M. R	10 00

Maryland Coal Co.	$1 00
Mason, Miss E. F.	500 00
Mason, Prof. James Weir	20 00
Mason, Miss S. C.	1 00
Matthews, Mrs. Edward	20 00
Matthews, Mrs. Edward, Summer Charities	20 00
Maurer, Henry & Son, Summer Charities	10 00
Maury, C. W	10 00
Maxwell, Helen and Priscilla	10 00
Maxwell, J. Rogers	50 00
Maxwell, J. Rogers, Fresh Air Fund	50 00
Maxwell, Robert	10 00
Mayer, Justice J. M., distribution	5 64
Mayer, Max W., Summer Charities	5 00
Mayer, Siegfried W., Summer Charities	10 00
Mayer, Otto L	10 00
Mayer, Otto L., Summer Charities	10 00
Mayo, Mrs. Henry O., Summer Charities	10 00
Mead, Mrs. G. B., Jr., Sick Children's Mission	20 00
Mead, Miss M. E., Summer Charities	2 00
Mead, Miss Stella B	5 00
Mead, Miss Stella B., Summer Charities	10 00
Mechlin, Mr. and Mrs. L., in memory of Robert L. Mechlin	5 00
Meeker, Mrs. C. H	25 00
Meeker, F. H	1 00
Meeker, Mrs. Mary E., Summer Charities	25 00
Meeteer, Wesley	2 00
Mehler, Mrs. Eugene	20 00
Melcher, Mrs. John L	10 00

Meldrum, G. H.	$10 00
Melvin, Mrs. M. E., Summer Charities	10 00
Mendes, Maria Pereira, Fresh Air Fund	10 00
Merritt, Mrs. George	10 00
Mershon, Ralph D	25 00
Mershon, Ralph D., Summer Charities	25 00
Mersick, C. S	5 00
Meserole, Abraham	10 00
Metcalf Bros. & Co	50 00
Metcalf Bros. & Co., Summer Charities	25 00
Meyers, Mrs. E. L	5 00
Middlebrook, William W	2 00
Middleton & Co	10 00
Middleton & Co., Summer Charities	10 00
Milbank, Albert J., Summer Charities	25 00
Milbank, Joseph	150 00
Milbank, Joseph, Summer Charities	250 00
Milbank, Mrs. Joseph	100 00
Milholland, John E., Summer Charities	10 00
Millard, Mrs. George H	5 00
Millard, Mrs. George H., Summer Charities	10 00
Miller, Dr. George N	20 00
Miller, Dr. George N., Summer Charities	20 00
Miller, H. H	2 00
Miller, Harry	1 00
Miller, Roswell	50 00
Miller, Roswell, Summer Charities	50 00
Miller, Samuel J	10 00
Milliken, E. F	25 00
Milliken, E. F., Summer Charities	25 00

Milmine, C. E., Summer Charities	$25 00
Milmine, George, Summer Charities	25 00
Mills, D. O.	100 00
Mills, Samuel H., Jr., Summer Charities	5 00
Mills, W. McMaster, Summer Charities	5 00
Mills & Gibb	25 00
Mills & Gibb, Summer Charities	20 00
Minturn, Mrs. John W., Emigration	20 00
Minturn, Mrs. John W., Summer Charities	20 00
Minturn, Mrs. R. B.	25 00
Minturn, R. S., Emigration	20 00
Miss Spence's School Society, Henrietta School, Class for Crippled Children	1,357 39
Mitchell, Mrs. Alfred, Fresh Air Fund	100 00
Mitchell, Edward	100 00
Mitchell, Roland G.	50 00
Mitchell, S. Roger	5 00
Mitchell, S. Roger, Summer Charities	5 00
Mitchell, William, Summer Charities	50 00
Mitchell, William, East Side School	20 00
Mix, Robert J.	5 00
Mix, Robert J., Summer Charities	10 00
Monday Sewing Class, West Side School	100 60
Moffat, Mrs. R. Burnham, Summer Charities	10 00
Molleson Bros. Co.	5 00
Montant, Alphonse	5 00
Montgomery, H. B.	10 00
Montgomery, John S.	1 00
Moore, Mrs. Albert, Henrietta School	5 00
Moore, Charles E.	6 00

Moore, Charles E., Summer Charities	$3 00
Moore, Mrs. Clement C., Summer Charities	10 00
Moore, Mrs. E. C	10 00
Moore, Edward C., Jr	25 00
Moore, Edward C., Jr., Summer Charities	25 00
Moore, Mrs. J. C	5 00
Moore, Katharine P., Summer Charities	4 00
Moore, Miss Katharine T	15 00
Moore, Miss Katharine T., Emigration	100 00
Moore, Miss Katharine T., Summer Charities	30 00
Moore, Robert, & Co	25 00
Moore & Calvi, Summer Charities	5 00
Moore & Schley	100 00
Moran, Anson B., Summer Charities	5 00
Morgan, Miss	3 00
Morgan, Miss Caroline L., Emigration	20 00
Morgan, E. D., Summer Charities	25 00
Morgan, Joanna A	5 00
Morgan, J. Pierpont, Summer Charities	200 00
Morgan, Mrs. J. Pierpont, Henrietta School	10 00
Morgan, Mrs. John B., Summer Charities	50 00
Morgan, Mrs. R. C	1 00
Morgan, W. Rogers, Summer Charities	10 00
Morison, Mrs. Julia S	50 00
Morosini, G. P., Italian School	100 00
Morris, Miss E. V. C	20 00
Morris, Miss E. V. C., Summer Charities	25 00
Morris, Miss E. V. C., West Side School	65 00
Morris, Mrs. J. J., Summer Charities	5 00
Morris, Mrs. Newbold, West Side School	45 83

Morris, Mrs. Newbold, Summer Charities	$25 00
Morse, Frank E., Co	5 00
Morss, G. H., Haxtun Cottage	2 00
Moses, Mrs. James, Fifty-third Street School	1 00
Mosle, George R., Jr., $1, and Sister, 50 cents	1 50
Mott, Mrs. M. I., Christmas	3 00
Mount & Woodhull	5 00
Mount & Woodhull, Summer Charities	5 00
Mower, Miss S. E	30 00
Mower, Miss S. E., Summer Charities	20 00
Müller, Schall & Co., Summer Charities	25 00
Munger, H. C., Emigration	20 00
Munger, H. C., Summer Charities	10 00
Munn, Charles A., Summer Charities	25 00
Munn, O. D	30 00
Munn, O. D., Summer Charities	15 00
Munro, John, Fifty-third Street School	10 00
Munroe, Mrs. Chester	5 00
Munroe, Mrs. Chester, Summer Charities	5 00
Munroe, Mrs. Henry Whitney	10 00
Munroe, Mrs. Henry Whitney, Summer Charities	25 00
Murphy, Edmund E	5 00
Murphy, Edmund E., Summer Charities	5 00
Murray, J. A	5 00
Murray, James P	1 00
Murray, Mrs. S. W., Emigration	80 00
Murray, Samuel Wilson, Emigration	20 00
Myers, Dr. T. Halsted	5 00
"N. and H.," Sullivan Street School	10 00
"N. J."	100 00

Nash, E. S	$20 00
Neal, T. E	2 00
Nelson, L. H., Summer Charities	5 00
Nesbit, Q. D., Fresh Air Fund	5 00
Nettleton, Charles H., Summer Charities	5 00
Nettleton, Ellen A., Emigration	20 00
Nettleton, Katharine A., Emigration	20 00
New, William A	5 00
New, William A., Summer Charities	10 00
New Home Sewing Machine Co	5 00
New York Safety Steam Power Co	10 00
Newbery, F. T., Summer Charities	1 00
Newell, E. M	1 26
Newell, Emerson R., Summer Charities	5 00
Newell, George W	5 00
Newman, J., Summer Charities	5 00
Nicholas, Miss Mabel W	1 00
Nichols, George E., Summer Charities	50 00
Nichols, George L	15 00
Nichols, George L., Summer Charities	15 00
Nichols, Morton C	10 00
Nichols, Seth	10 00
Nichols, William G., Summer Charities	10 00
Niven, William B., Summer Charities	10 00
Noe, William R., Summer Charities	5 00
Norris, J. W., Summer Charities	1 00
North, Thomas M	25 00
North, Thomas M., Summer Charities	10 00
Norton, George F	25 00
Nourse, C. J., Jr., Summer Charities	10 00

Noxon, Mrs. H. E., Summer Charities	$1 00
Oakes, Francis J., Summer Charities	30 00
Oakes, W. Foster	1 00
Oakes, W. Foster, Summer Charities	1 00
Offerman, Theodore, Summer Charities	25 00
Offord, John A	1 00
Offord, John A., Summer Charities	1 00
Ogden, Charles W., Sick Children's Mission	10 00
Ogden, Mrs. Charles W	25 00
Ogden, Mrs. Charles W., Summer Charities	20 00
Ogden, Mrs. Charles W., Sick Children's Mission	10 00
Ogden, Miss Mary F	10 00
Ogden, Robert C	10 00
Ogden, Mrs. W. B	75 00
Oldham, Edward M	5 00
Olds, E. A	20 00
Olyphant, James H	10 00
Olyphant, R. M	5 00
Opdyke, William S., Summer Charities	50 00
Oppenheimer, Margaret, Summer Charities	5 00
Ordronaux, John	10 00
Ordronaux, John, Summer Charities	10 00
Ordway, Samuel H., Summer Charities	10 00
Ormiston, T. D., Summer Charities	5 00
Osborn, A. Perry	10 00
Osborn, H. Fairfield, Jr	10 00
Osborn, Miss Josephine	10 00
Osborn, Miss Virginia Sturges	10 00
Osborn, William Church, Farm School	500 00
Osborn, William Church, Cooking Classes (1902)	409 39

Osborn, William Church, Cooking Classes (1903).....	$312 76
Osborn, William Church, special donations...........	63 00
Osborn, Mrs. William Church, Babies' Mission........	45 00
Overocker, W. J............................	5 00
Ovington, Theodore T.........................	25 00
Page, Carroll S............................	1 00
Page, Edward D., Summer Charities................	10 00
Page, Frederick P..........................	5 00
Page, William H., Jr.........................	5 00
Page, William H., Jr., Summer Charities............	50 00
Paine, C. H.............................	20 00
Painter, C. L., Summer Charities..................	10 00
Palmer, M., Fresh Air Fund.....................	10 00
Parish, Miss Susan D.........................	25 00
Parker, Prof. H. C..........................	2 00
Parker, James V...........................	5 00
Parker & McIntyre..........................	5 00
Parkin, Mrs. M. L..........................	3 00
Parkin, Mrs. M. L., Summer Charities..............	3 00
Parkin, Mrs. M. L., Thanksgiving..................	2 00
Parsons, Mrs. Edwin.........................	15 00
Parsons, Mrs. Edwin, Fresh Air Fund..............	10 00
Parsons, H. de B...........................	5 00
Parsons, H. de B., Summer Charities..............	5 00
Parsons, James H...........................	1 00
Parsons, John E., Lord Memorial School............	100 00
Parsons, Schuyler L..........................	20 00
Parsons, Schuyler L., Fresh Air Fund..............	20 00
Parsons, Mrs. William Barclay, Summer Charities....	25 00
Passavant & Company, Summer Charities...........	20 00

Patterson, A.	$5 00
Patterson, C. Godfrey, Summer Charities	5 00
Peabody, Stephen, Emigration	20 00
Pearsall, J. W	5 00
Pearson, Mrs. Frederick	10 00
Peck, the Misses, Children's Annex	20 00
Peet, A. S	1 00
Peet, Abraham S	1 25
Pell, Alfred Duane, support of bed, Summer Home	30 00
Pell, Mrs. Clarence	5 00
Pell, Mrs. John H., Summer Charities	25 00
Penfold, Miss Josephine	25 00
Penfold, Miss Josephine, Summer Charities	50 00
Penfold, William Hall	25 00
Pennington, Joseph P	5 00
Pennington, Joseph P., Summer Charities	5 00
Pepper, Mrs., Health Home	1 00
Perine, E. T	5 00
Perine, E. T., Summer Charities	5 00
Perkins, George W., Summer Charities	100 00
Perkins, Goodwin & Co	5 00
Perkins, Goodwin & Co., Summer Charities	5 00
"Peter Cooper Golden Wedding Fund"	200 00
Peterson, Mrs. Wilson	20 00
Peterson, Mrs. Wilson, Summer Charities	25 00
Petigrew, R. H	5 00
Petigrew, R. H., Summer Charities	5 00
Pettit, Franklin	10 00
Peyton, H. M	20 00
Philbrick, Miss Grace N	5 00

Philbrick, Miss Grace N., Summer Charities	$5 00
Philips, E.	5 00
Phillips, Mrs., Henrietta School	10 00
Phillips, William D., Fresh Air Fund	25 00
Phipps, Henry, Haxtun Cottage for Crippled Children	50 00
Phipps, Henry, Health Home	200 00
Phipps, Miss S. M., Fresh Air Fund	25 00
Pickford, L. D	5 00
Pickford, L. D., Summer Charities	10 00
Pierce, H. A	1 00
Pierce, William B	5 00
Pike, J. W	1 00
Pinchot, Gifford, Summer Charities	25 00
Pinchot, Mrs. James W	25 00
Pinchot, Mrs. James W., Summer Charities	25 00
Pinkerton, Robert A	5 00
Pinkerton, Robert A., Summer Charities	5 00
Pinkham, Mrs. J. W	100 00
Pinkham, Mrs. J. W., Summer Charities	100 00
Pirie, S. C., Summer Charities	5 00
Pirnie, Miss, 53d Street School	2 00
Pitkin, Edward W	5 00
Pitman, S. M., Emigration	20 00
Pitman, S. M., Summer Charities	25 00
Planten, J. R	10 00
Planten, J. R., Summer Charities	10 00
Platt, M. J	1 00
Plaut, Albert	50 00
Plaut, Joseph, Summer Charities	10 00
Poggenburg, H. F	5 00

Polk, Frank L.	$10 00
Polk, Frank L., Summer Charities	20 00
Polk, Dr. W. M.	25 00
Polk, Mrs. W. M., Haxtun Cottage for Crippled Children	10 00
Pomroy, H. A., Emigration	40 00
Pope, Albert L., Summer Charities	5 00
Pope, Sylvester	10 00
Pope, Sylvester, Summer Charities	10 00
Porte, Leon	100 00
Porter, C. W.	3 25
Porter, Herbert G.	2 00
Porter, William R.	25 00
Post, Abram S.	5 00
Post, H. A. V.	10 00
Post, W. K.	10 00
Potter, Mrs. Charles	3 00
Potter, Charles E.	3 00
Potter, Mrs. Henry C., Henrietta School	20 00
Potts, Charles Edwin, Summer Charities	2 00
Powers, John C.	5 00
Pratt, Herbert L.	15 00
Preble, W. P., Jr.	5 00
Prentice, Daniel, Summer Charities	5 00
Prentice, Robert Kelly	5 00
Prentice, Robert Kelly, Summer Charities	5 00
Presbyterian Church, Springfield, L. I.	10 00
Prime, Miss Mary R., Summer Charities	20 00
Proal, A. B.	20 00
Proal, A. B., Summer Charities	15 00

Probasco, Samuel	$5 00
Probation Committee	1,540 00
Proceeds of Entertainment at Manhanset House, Shelter Island, Fresh Air Fund	39 06
Proceeds of Fair by several little girls of the Heusinger School, Fresh Air Fund	25 00
Proctor, Mrs. James Howe, Summer Charities	5 00
Prosser, Robert W	5 00
Prosser, Robert W., Summer Charities	5 00
Prosser, Thomas & Son	25 00
Prudden, Prof. T. M	25 00
Prudden, Prof. T. M., Summer Charities	25 00
Pupils of the Intermediate Department, Clarke School	3 00
Pupils of the Misses Graham's School, Christmas	12 50
Purdy, J. Henry	30 00
Purdy, J. Henry, Summer Charities	25 00
Putnam, W. A., Emigration	20 00
Pyle, James & Son	25 00
"R," Summer Charities	40 00
"R. A. R."	10 00
Raht, Charles, Summer Charities	25 00
Ramsdell, Mrs. Charles F	2 00
Ramsdell, Mrs. Charles F., Summer Charities	2 00
Rand, Charles F	25 00
Rand, Charles F., Summer Charities	20 00
Randolph, Alan Fitz	2 00
Raoul, Gaston C	10 00
Rath, John	1 00
Read, William A	100 00
Read, William A., Summer Charities	100 00

Ready Circle, King's Daughters, Mamaroneck, N. Y., Health Home	$40 00
Reboul, H. W.	25 00
Reboul, H. W., Summer Charities	25 00
Redfield, Prof. Henry S	5 00
Redmond, Miss	25 00
Redmond, Miss, Summer Charities	25 00
Reed, Mrs. Edward	5 00
Reed, William B.	10 00
Reed, William B., Summer Charities	10 00
Reid, Daniel G., Summer Charities	50 00
Reid, Willard C., Fifty-third Street School	5 00
Reisinger, Hugo	5 00
Reisinger, Hugo, Summer Charities	5 00
Remington, H. W	2 00
Remington, H. W., Summer Charities	2 00
Renwick, Mrs. H. B	100 00
Reynolds, Mrs. J. D., Summer Charities	10 00
Rhinelander, Charles E., Emigration	20 00
Rhinelander, Mrs. Charles E., Emigration	20 00
Rhinelander, Miss Serena, Rhinelander School	750 00
Rhinelander, Miss Serena, Sullivan Street School	505 00
Rhinelander, Miss Serena, Fresh Air Fund	250 00
Rhinelander, Miss Serena, Boys' Camp	100 00
Rhinelander, William, Summer Charities	5 00
Rhoades, Miss H., Summer Charities	5 00
Rich, Charles A., Summer Charities	5 00
Richard, Auguste	100 00
Richard, W. L.	1 00
Richards, Dickinson W	10 00

Richards, E. G., Summer Charities	$10 00
Richards & Heald	5 00
Richardson, W. G	2 00
Richmond, Arthur A	10 00
Riegel, Mrs. John L	10 00
Riggs, Rev. James F	5 00
Riker, Samuel, Summer Charities	25 00
Ripley, Miss Eliza C	5 00
Ripley, Miss Eliza C., Summer Charities	10 00
Risley, G. H., Summer Charities	100 00
Robb, J. Hampden	20 00
Robb, N. Thayer	10 00
Roberts, Prof. Charles	5 00
Roberts, Charles L	5 00
Roberts, G. Theodore	10 00
Roberts, Mrs. J. L	20 00
Roberts, Mrs. J. L., Summer Charities	20 00
Roberts, John E., Summer Charities	5 00
Robertson, Miss J., Summer Charities	5 00
Robertson, L. F. & Sons	20 00
Robertson, L. F. & Sons, Summer Charities	25 00
Robertson, Lorne and Jessie	2 00
Robbins, H. P	10 00
Robbins, Herbert D., Summer Charities	10 00
Robbins, Julian W	5 00
Robins, Francis F	15 00
Robins, Francis F., Summer Charities	25 00
Robins, Thomas, Jr	5 00
Robinson, Caldwell and Elizabeth	20 00
Robinson, Caldwell and Elizabeth, Emigration	20 00

Robinson, Charles K., Summer Charities............	$25 00
Robinson, Douglas, Sullivan Street School..........	15 00
Robinson, Douglas, West Side School...............	15 00
Robinson, Douglas, West Side Italian School........	10 00
Robinson, Douglas, and friends, West Side Lodging House	98 26
Robinson, Mrs. John A............................	5 00
Robinson, Mrs. John A., Fresh Air Fund............	10 00
Rockefeller, John D..............................	2,500 00
Rockhill, Clayton, Henrietta School................	5 00
Rockwood, George G..............................	5 00
Rockwood, George G., Summer Charities............	5 00
Roe, Livingston..................................	25 00
Roe, Livingston, Summer Charities.................	25 00
Roessler & Hasslacher Chemical Co.................	10 00
Rogers, H. A.....................................	20 00
Rogers, Miss H. B................................	2 00
Rogers, Mrs. J. Warren, Tompkins Square School....	7 00
Rogers, L. Harding, Jr...........................	1 00
Rogers, Robert...................................	10 00
Rogers, Robert Fletcher, Summer Charities..........	10 00
Rollins, W. F., Summer Charities..................	20 00
Roosevelt Children, the five, Emigration............	20 00
Roosevelt, Mrs. James A..........................	100 00
Roosevelt, Mrs. James A., Summer Charities........	100 00
Roosevelt, Robert B., Summer Charities.............	10 00
Roosevelt, W. Emlen and James K., Gracie, Thanksgiving, West Side Lodging House..................	45 31
Roosevelt, Mrs. W. Emlen, Sick Children's Mission....	25 00
Ropes, W. L......................................	2 00

Ross, David A., Emigration	$20 00
Ross, William B., Farm School	30 00
Rossiter, Ehrick K	5 00
Rothschild Brothers & Co	5 00
Rothschild Brothers & Co., Summer Charities	5 00
Rouse, J. E	2 00
Rouse, J. E., Summer Charities	1 00
Rowe, B. W	5 00
Rowe, B. W., Summer Charities	5 00
Runk, Mrs. Charles A	10 00
Runk, Mrs. Charles A., Sick Children's Mission	5 00
Russell, Mrs. Archibald D., West Side Italian School	20 00
Russell, Charles H., Summer Charities	50 00
Rutter, Mrs. Thomas	10 00
"S. T. A."	5 00
Sachs, Mrs. Samuel	10 00
Sachs, Mrs. Samuel, Summer Charities	10 00
Sackett, Mrs. Adam Tredwell	25 00
Sackett, Mrs. Adam Tredwell, Summer Charities	25 00
Sackett, Henry Woodward	7 00
Sackett, Henry Woodward, Summer Charities	5 00
Safety Car Heating and Lighting Co	25 00
Sage, Dean, Summer Charities	10 00
St. Agnes' Chapel, Fresh Air Fund	25 00
St. Bartholomew's Parish House, Fresh Air Fund	150 00
Sallinger, Edward	10 00
Sallinger, Edward, Summer Charities	10 00
Sanderson, J. Murray, Summer Charities	10 00
Sands, Miss Elizabeth, Phelps School	5 00
Sands, Mrs. P. J., Phelps School	50 00

Sands, William R., Summer Charities	$50 00
Sanford, H., Summer Charities	5 00
Sanford, Henry G	10 00
Sanford, May T	1 00
Sargent, Miss G. W	20 00
Sargent, Miss Lena P	2 00
Satterlee, Mr. and Mrs. Herbert	100 00
Satterlee, Mr. and Mrs. Herbert, Summer Charities	100 00
Saunders, John F	5 00
Saunders, John F., Summer Charities	2 00
"Savings of Carola, Frederick and Gerald," Summer Charities	100 00
Sawyer, Mrs., Henrietta School	2 00
Sawyer, Mrs. A. H	5 00
Sawyer, Mrs. A. H., Summer Charities	5 00
Sayre, Miss Mary Hall	5 00
Sayre, Miss Mary Hall, Summer Charities	10 00
Sayre, W. H., Jr., Summer Charities	25 00
Sbarbaro, Augustus	35 00
Sbarbaro, Augustus, Summer Charities	10 00
Schaefer, Henry	20 00
Schefer, Schramm & Vogel	20 00
Schelker, Walter G	5 00
Schenck, C. N., Newsboys' Lodging House	1 00
Schenck, F. B	10 00
Schermerhorn, Miss Sarah, Fresh Air Fund	80 00
Schermerhorn, Miss Sarah, West Side School	51 88
Schermerhorn, William C	100 00
Schermerhorn, Mrs. William C., West Side School	10 00
Schieffelin, Mrs. H. M	30 00

Schieffelin, Mrs. W. H., Sick Children's Fund	$5 00
Schiff, Jacob H., Summer Charities	200 00
Schiff, Jacob H., East Side School	25 00
Schiff, Mortimer L	50 00
Schiff, Mortimer L., Summer Charities	100 00
Schirmer, Charles	1 00
Schmelzel, Clarence and James	5 00
Schmelzel, Miss Jane E., support of "Louise Bed," Summer Home	30 00
Schmelzel, Miss Jane E., in memory of Frederick R. Schmelzel, Emigration	20 00
Schmidt, Robert G	1 00
Schniewind, Heinrich, Jr., Summer Charities	20 00
Schoonmaker, H., 53d Street School	1 00
Schott, Charles M., Jr	20 00
Schott, Charles M., Jr., Summer Charities	10 00
Schrader, George H. F	50 00
Schroeder, Mrs. Francis	10 00
Schroeder, Mrs. Francis, Summer Charities	5 00
Schüllinger, J., Fresh Air Fund	3 00
Schuyler, Misses Georgina and Louisa Lee Schuyler, West Side School	190 00
Schwab, Mrs. Gustav	5 00
Schwab, Mrs. Gustav, Summer Charities	20 00
Schwab, Mrs. Herman C	10 00
Schwab, Mrs. Herman C., support of bed, Health Home	30 00
Schwab, Miss Lucy S	5 00
Schwarz, F. A. O	5 00
Scott, Dr. Albert L., Emigration	20 00
Screven, John H	5 00

Scudder, Lorin Kent, Summer Charities	$25 00
Seaman, F. A	5 00
Sears, Marcus C	5 00
Seaver, Lewis M	5 00
Sedgwick, Henry D	25 00
Sedgwick, Henry D., Summer Charities	20 00
See, A. B., Elevator Co	25 00
Seeley, Mrs. Nathan, Summer Charities	10 00
Seligman, Isaac N	25 00
Seligman, Mrs. Isaac N., Summer Charities	25 00
Serrell, Harold	1 00
Servoss, H. L	5 00
Sewall, Mrs. Arthur W., 44th Street School	5 00
Sexton, Mrs. Edward B	10 00
Sexton, Lawrence E., Summer Charities	10 00
Seyd, William	5 00
Seymour, Rev. Storrs O	5 00
Sharp, Mrs. J., Duane Street School	5 00
Sharpe, Cecil	1 00
Shaw, J. W., Summer Charities	10 00
Shaw, John C	5 00
Shaw, Mrs. Robert G	100 00
Sheafer, Henry	10 00
Sheffield, John R., and little son	1 00
Sheldon, Clarence D	5 00
Sheldon, Henry K	25 00
Sheldon, Mrs. James	10 00
Shepard, C. Sidney, Summer Charities	25 00
Shepard, Mrs. Elliot F	100 00
Sherman, Frederick D., Emigration	20 00

Sherman, Outram W., Summer Charities............	$5 00
Shillaber, William..................................	10 00
Shillaber, William, Summer Charities................	10 00
Shillaber, William, Jr., Summer Charities............	10 00
Shoemaker, Mrs. J. H., Boys' Farm..................	30 00
Shortland, Mrs., Sullivan Street School..............	10 00
Shrier, Samuel, Summer Charities..................	10 00
Sibley, Mrs. H. W., Emigration.....................	20 00
Sibley, Mrs. H. W., Christmas.......................	5 00
Sick Children's Aid Society, Brick Church, Fresh Air Fund	91 25
Sickels, Robert, Emigration.........................	20 00
"Sidney"	5 00
Siedenburg, Rhd....................................	20 00
Siedenburg, Rhd., Summer Charities................	5 00
Silliman, H. B., Summer Charities..................	50 00
Simons, Charles D..................................	5 00
Simons, Charles D., Jr., Summer Charities..........	25 00
Simons, James D., Fresh Air Fund..................	10 00
Simons, William A..................................	1 00
Simpson, John W., Summer Charities................	25 00
Simpson, W. T.......................................	5 00
Sinclair, D. J..	20 00
Singer, M. M., Summer Charities....................	10 00
Skiddy, Mrs. William W............................	10 00
Slade, Francis Louis, Summer Charities............	100 00
Slade, Mrs. Marshall Perry..........................	5 00
Sloan, Benson B., Summer Charities................	5 00
Sloan, Samuel, Summer Charities..................	20 00
Sloane, Henry T.....................................	25 00

Sloane, Henry T., Summer Charities.................	$30 00
Sloane, Mrs. William Douglas, Sixth Street School...	3,450 00
Sloane, Mrs. William Douglas, Health Home.........	2,000 00
Small, Miss Cora................................	5 00
Smallwood, Mrs. J. S., Summer Charities............	3 00
Smellie, E., Henrietta School.....................	10 00
Smith, Mrs. Abel I., Phelps School.................	10 00
Smith, Mrs. Charles D............................	20 00
Smith, F. Gordon................................	1 00
Smith, Mrs. Fitch................................	1 00
Smith, Mrs. Frances Wilbur........................	5 00
Smith, George C.................................	25 00
Smith, George C., Henrietta School.................	20 00
Smith, George C., Summer Charities.................	25 00
Smith, George H.................................	10 00
Smith, Helen Dominick, Phelps School...............	10 00
Smith, Howard C., Summer Charities................	25 00
Smith, Isaiah P.................................	5 00
Smith, Isaiah P., Summer Charities.................	1 00
Smith, James Rufus..............................	10 00
Smith, James Rufus, Summer Charities...............	10 00
Smith, Joseph D.................................	2 00
Smith, Mrs. L. Jacquelin..........................	5 00
Smith, Mrs. M., Henrietta School..................	5 00
Smith, Mrs. N. Denton...........................	5 00
Smith, Ormond G................................	10 00
Smith, Seymour R...............................	5 00
Smith, Rev. W. Merle, 53d Street School............	5 00
Smith, Wm. W., Summer Charities..................	5 00
Smith and McLaurin, Summer Charities.............	3 00

Smithers, F. S.	$25 00
Smithers, F. S., Summer Charities	50 00
Snow, Frederick A.	50 00
Snow, Frederick A., Summer Charities	50 00
Snyder, Mrs. C. H., Tompkins Square School	5 00
Sommerfeld, Hugo	2 00
Sommerfeld, Hugo, Summer Charities	2 00
Soren, George W	25 00
Spaulding, D. S	1 00
Speers, James M	20 00
Speers, James M., Summer Charities	25 00
Spencer, George E., Summer Charities	10 00
Spencer, Mrs. Robert T	20 00
Spencer, Mrs. Robert T., Summer Charities	25 00
Speyer, James, German School	100 00
Spool Cotton Co., Summer Charities	10 00
Spring, Miss Anna Riker	10 00
Spring, Miss Anna Riker, Summer Charities	15 00
Squire, George H., Jr., Summer Charities	30 00
Stafford, A. N	2 00
Stamford Manufacturing Co., Health Home	15 00
Stamford Manufacturing Co., Industrial Schools	10 00
Stanton, John	10 00
Stanton, Mrs. L. L	5 00
Stanton, S. K	5 00
Star Lubricating Co., West Side Lodging House	22 90
Starbuck, C. A., Summer Charities	25 00
Starr, Louis Morris	20 00
Stearns, Louis	2 00
Stearns, Louis, Summer Charities	5 00

Stearns, Mrs. V. B.	$1 00
Steel Rail Supply Co	25 00
Steele, Charles	25 00
Stehle, Miss Clara	3 00
Steindler, Edward, Summer Charities	10 00
Stephens, Benjamin	50 00
Stephens, Benjamin, Summer Charities	20 00
Stephens, Rev. George H	2 00
Stephens, Rev. George H., Summer Charities	2 00
Stephens, Thomas Wilcox	10 00
Stephens, Thomas Wilcox, Summer Charities	10 00
Sterling, Edward, Summer Charities	5 00
Stern, Benjamin, Summer Charities	20 00
Stern, Mrs. Isaac	25 00
Stetson, Francis Lynde, Summer Charities	10 00
Steuhl, Jacob	25 00
Stevenson, S. M., Summer Charities	5 00
Steward, John, East Side School	1,293 00
Steward, Mrs. John, Health Home	100 00
Steward, Mrs. John, Sick Children's Mission	100 00
Steward, Mr. and Mrs. John, Sick Children's Mission	200 00
Stewart, Samuel	25 00
Stewart, Samuel, Summer Charities	10 00
Stewart, Wm. W	5 00
Stewart, Wm. W., Summer Charities	5 00
Stickney, Joseph, Summer Charities	20 00
Stickney, Wm. B	10 00
Stiger, Miss Frances A., Summer Charities	5 00
Stillman, Charles, Emigration	50 00
Stilwell, Miss Alice	5 00

Stilwell, Dr. B. W.	$5 00
Stilwell, Dr. B. W., Summer Charities	25 00
Stilwell, Mrs. B. W	5 00
Stilwell, J. Warren	5 00
Stilwell, John	5 00
Stilwell, Mary	5 00
Stimson, Mrs. E. P., Sullivan Street School	20 00
Stimson, Henry L	10 00
Stoddart, A. R	5 00
Stoiber, A. H	25 00
Stoiber, G. H	10 00
Stokes, Anson Phelps, Summer Charities	25 00
Stokes, Mrs. Anson Phelps, Phelps School	300 00
Stone, Mrs. A. B., Christmas, Henrietta School	5 00
Stone, Mrs. A. B., Summer Home	25 00
Stone, John Francis	5 00
Stone, Mason A	1 00
Stone, Sumner R	50 00
Stone, Sumner R., Summer Charities	50 00
Stott, James	10 00
Stott, James, Summer Charities	10 00
Stout, J. D. & Co	10 00
Stout, Joseph S., Jr., Summer Charities	5 00
Strang, Mrs. F. R., Summer Charities	10 00
Strauss, Miss, Henrietta School	3 00
Strauss, Mrs. C. and Edith C. Strauss, Summer Charities	6 00
Strohmeyer & Arpe Co	5 00
Strong, Chester Bedford, Summer Charities	5 00
Strong, Henry M., Summer Charities	1 00

Strong, Jennie C.	$25 00
Sturges, W. C., Summer Charities	10 00
Stursberg, W	10 00
Stuyvesant, Rutherfurd	25 00
Stuyvesant, Rutherfurd, Summer Charities	50 00
Sunday School, First Baptist Church, Hope Valley, R. I.	10 00
Sunday School, St. Andrew's Episcopal Church, New Berlin, N. Y.	6 00
Sunday School, Christ Episcopal Church, Hackensack, N. J., Emigration	20 10
Sunday School of the Chapel of the Incarnation, Haxtun Cottage	10 00
Sunday School, Congregational Church, Sayville, L. I.	17 57
Sunday School, Congregational Church, Sayville, L. I., Fresh Air Fund	10 35
Sunday School Congregational Church, South Glastonbury, Conn., Henrietta School	4 05
Sunday School, Congregational Church, Monson, Mass., Emigration	20 06
Sunday School, Congregational Church, Monson, Mass., Miss Keep's class of girls, Emigration	3 30
Sunday School, Congregational Church, Clinton, Conn.	2 51
Sunday School, Congregational Church, Woodstock, Vt.	6 08
Sunday School, Congregational Church, Riverhead, N. Y.	5 45
Sunday School, Congregational Church, Deep River, Conn.	6 00

Sunday School, Congregational Church, Hampton, Me., Emigration	$20 00
Sunday School, Congregational Church, Brookfield Centre, Conn., Fresh Air Fund	10 00
Sunday School, First Congregational Church, Sharon, Conn.	10 15
Sunday School, First Congregational Church, Bristol, Conn., Fresh Air Fund	12 01
Sunday School, Second Congregational Church, New London, Conn	13 80
Sunday School, Saugatuck Congregational Church, Westport, Conn	3 92
Sunday School, First Unitarian Congregational, Yonkers, N. Y., Emigration	20 00
Sunday School, Presbyterian Church, Ovid, N. Y.	9 82
Sunday School, Presbyterian Church, Garfield, N. J.	1 00
Sunday School, Presbyterian Church, Chatham, N. J.	10 00
Sunday School, Presbyterian Church, Scarborough, N. Y.	20 00
Sunday School, Presbyterian Church, South Haven, L. I.	2 10
Sunday School, Presbyterian Church, Lima, N. Y.	60
Sunday School, Presbyterian Church, East Main, N. Y.	2 00
Sunday School, Presbyterian Church, East Hampton, N. Y.	14 98
Sunday School, First Presbyterian Church, East Orange, N. J.	100 00
Sunday School, First Presbyterian Church, South Orange, N. J.	7 00

Sunday School, First Presbyterian Church, Carbondale, Pa.	$7 50
Sunday School, First Presbyterian Church, Bordentown, N. J., Haxtun Cottage	2 50
Sunday School, Bethel Presbyterian Church, East Orange, N. J., East River School	10 00
Sunday School, Christ Presbyterian Church Missionary Society, Hempstead, L. I.	10 00
Sunday School, Mt. Washington Presbyterian Church.	4 57
Sunday School, Methodist Episcopal Church, Montclair, N. J., Emigration	16 16
Sunday School, Reformed Church, Piermont, N. Y., Emigration	20 00
Sunday School of the Church on the Heights, Brooklyn.	15 00
Sunday School, Somerville, Conn.	4 00
Sunday School, Walton, N. Y., Henrietta School	4 25
Sunday School, Fredonia, N. Y.	5 78
Sunday School, Salem, near Dalton, Ohio	14 25
Sunday School Class of Marie A. Bond, Summit, N. J.	1 00
Suydam, John R., Summer Charities	10 00
Suzanne, Margaret, and little Billy	50 00
Suzarte & Whitney	25 00
Swan, F. C.	10 00
Swan, F. C., Summer Charities	20 00
Swan, Mrs. J. Andrews	10 00
Swan, Mrs. J. Andrews, Summer Charities	25 00
Swords, Miss P. C.	10 00
Swords, Miss P. C., Fresh Air Fund	20 00
Symington, Albert	10 00
Symington, Mrs. Albert, Summer Charities	10 00

Symonds, W. P.	$10 00
Symonds, W. P., Summer Home	15 00
Taintor, H. F., Manufacturing Co.	15 00
Taintor, H. F., Manufacturing Co., Summer Charities	25 00
Talbot, Wm. R., Summer Charities	5 00
Talcott, Mr. and Mrs. Herbert, 53d Street School	5 00
Tappin, Charles L.	20 00
Tappin, Charles L., Summer Charities	20 00
Tarbox, Hiram	1 00
Tarbox, Hiram, Summer Charities	1 00
Tattock, John, Summer Charities	5 00
Tatum, Mrs. Edward	20 00
Taylor, Mrs. John B.	10 00
Taylor, Stevenson	10 00
Taylor, William H., Summer Charities	25 00
Teachers and Pupils of Miss Dana's School	10 00
Teachers and Pupils of Miss Dana's School, Emigration	60 00
Ten Broeck, Mrs. J. H. H.	50 00
Ten Broeck, Mrs. J. H. H., Summer Charities	25 00
Terry, Seth Sprague, Summer Charities	5 00
Thaw, Dr. and Mrs. A. Blair, Henrietta School	625 00
Thayer, Mrs. Albert S., Summer Charities	5 00
Thayer, Alfred E., Emigration	20 00
Thayer, Emma B.	15 00
Thayer, H. B.	10 00
Thayer, Rodney	10 00
Thayer, Rodney, Summer Charities	10 00
"The Neighbors' Missionary Society," New Utrecht Reformed Church, support of "Brush Bed," Summer Home	30 00

Thiele, E.	$10 00
Thomas, Mrs. T. Gaillard, Summer Charities	5 00
Thompson, Mrs	1 00
Thompson, Dorothy, Emigration	20 00
Thompson, Effie D	5 00
Thompson, Ferris S	30 00
Thompson, Mrs. Frederick F	200 00
Thompson, Mrs. Frederick F., Summer Charities	100 00
Thompson, Mrs. J. Walter, Summer Charities	10 00
Thompson, John F., Summer Charities	50 00
Thompson, Mrs. R. J., Sullivan Street School	50 00
Thompson, Mrs. Robert M	10 00
Thompson, Mrs. Robert M., Summer Charities	25 00
Thompson, William Prall	5 00
Thomson, John W	10 00
Thorn, W. K	25 00
Thorne, Miss P. A	100 00
Thorne, Miss P. A., Summer Charities	50 00
Thorne, Samuel	100 00
Thorne, Samuel, Summer Charities	100 00
Thorne, Samuel, Jr	20 00
Thorne, Samuel, Jr., Summer Charities	10 00
Thorne, W. V. S	10 00
Thorne, W. V. S., Summer Charities	10 00
Tichenor, C. O., Emigration	155 00
Tiemann, D. F., & Co., Summer Charities	25 00
Tilden, Samuel J	10 00
Tilinghast, Mrs. Louise	10 00
Tilney, Mrs. John S	5 00
Tilt, Mrs. Albert	20 00

Timmermann, H. G	$10 00
Timmermann, H. G., Summer Charities	10 00
Timpson, Mrs. James, Emigration	25 00
Timpson, Mrs. James, Summer Charities	10 00
Tinker, Henry C., Summer Charities	10 00
Titus, Mrs. A. L	5 00
Titus, E., Jr	5 00
Titus, E., Jr., Summer Charities	20 00
Tod, J. Kennedy	50 00
Tod, J. Kennedy, Summer Charities	50 00
Tod, Com. Robert E., collection on board yacht Thistle, Summer Home	101 50
Tomkins, Calvin	5 00
Tomkins, Henry	5 00
Tompkins, C. H., Summer Charities	5 00
Tompkins, H. B., Summer Charities	2 00
Tompkins, Leslie J., Fresh Air Fund	10 00
Tompkins, Mrs. W. W., Emigration	40 00
Tompkins, Mrs. W. W., Thanksgiving	25 00
Tompkins, Mrs. W. W., Christmas	25 00
Tompkins, Mrs. W. W., Summer Charities	25 00
Tompkins, Mrs. W. W., Fresh Air Fund for Boys	50 00
Toothe, William	20 00
Toothe, William, Summer Charities	25 00
"Toward Christmas Dinner"	2 00
Towle, Frank E	10 00
Towne, Henry R	25 00
Towne, Paul R	25 00
Townsend, John	1 00
Townsend, John, Summer Charities	1 00

"Trevor, Carl, Ethel, May and George"	$5 00
Trowbridge, Charles A., Summer Charities	5 00
Trowbridge, Edwin D	25 00
Tuck, Dr. Henry	10 00
Tuck, Dr. Henry, Summer Charities	10 00
Tucker, Allen	25 00
Tucker, Allen, Summer Charities	50 00
Tucker, Mrs. Stephen D., Summer Charities	10 00
Tuckerman, Alfred	10 00
Tuckerman, Alfred, Emigration	40 00
Tuckerman, Alfred, Summer Charities	25 00
Tuckerman, Bayard	5 00
Tuckerman, Bayard, Emigration	50 00
Tuckerman, Bayard, Summer Charities	10 00
Tuckerman, Mrs. Lucius, Summer Charities	100 00
Turnbull, Mrs. Ramsay, Summer Charities	5 00
Turner, Mrs. Margaret H	3 00
Tuttle, Miss Austina	30 00
Tuttle, Miss Austina, Summer Charities	50 00
Tuttle, Mrs. Edwin Austin	1 00
Tuttle, W. H	20 00
"Two Englewood Boys"	10 00
Tyler, Mrs. Francis M., Fresh Air Fund	10 00
Uhlig & Co	10 00
Ullman, Louis J	5 00
Ullman, Louis J., Summer Charities	5 00
Ulmann, Bernhard	10 00
Upham, Charles H	2 00
Upham, Mrs. Elizabeth K., Emigration	20 00
Upham, Mrs. Elizabeth K., Summer Charities	5 00

Upton, P.	2 00
Vail, Mrs. Charles E.	20 00
Vail, Mrs. Charles E., Summer Charities	10 00
Valentine, T. S.	10 00
Van Alen, J. J., Summer Charities	300 00
Van Brunt, J. R.	5 00
Van Brunt, J. R., Summer Charities	5 00
Vanderbilt, Frederick W., Health Home	2,000 00
Vanderpoel, Mrs. J. A., Summer Charities	10 00
Van Ingen, Mrs. E. H., Pike Street School	50 00
Van Ingen, Mrs. E. H., Fresh Air Fund	50 00
Van Ingen, Philip	20 00
Van Nest, Mrs. Alexander T., Fresh Air Fund	25 00
Van Norden, Mrs. T. L., Summer Charities	5 00
Van Orden, T. B.	25 00
Van Pelt, Miss A. A. T.	5 00
Van Pelt, Miss A. A. T., Summer Charities	5 00
Van Pelt, Mrs. G. S.	10 00
Van Pelt, Mrs. G. S., Summer Charities	25 00
Van Rensselaer, Miss Alice	10 00
Van Slyck, George W.	10 00
Van Tassel, Florence, Summer Charities	1 00
Van Winkle, Edgar B.	10 00
Van Winkle, Miss Mary D.	10 00
Van Winkle, Miss Mary D., Summer Charities	20 00
Varoy, Mrs.	5 00
Vaux & Emery	50 00
Verdi, Mme. C. M., Summer Charities	25 00
Vermilye & Co., Summer Charities	100 00
Vietor, Mrs. George Frederick	5 00

Villard, Oswald G., Summer Charities	$5 00
"Vista Vasta," Emigration	100 00
Voorhees, Charles H	5 00
Voorhees, Charles H., Summer Charities	10 00
Vrooman, Mr. and Mrs. John W., Emigration	20 00
"W. M. P."	5 00
"W. W. and H. H."	10 00
Wadsworth, C. S., Emigration	20 00
Wadsworth, C. S., Summer Charities	10 00
Waentig, Charles R., Summer Charities	10 00
Wagner, John	10 00
Wagner, John, Summer Charities	10 00
Wagner, Louis C., Summer Charities	5 00
Waldburg, Jorge N., Babies' Mission	5 00
Waldo, Miss Julia L., Summer Charities	5 00
Walker, Miss Emily H., Elizabeth Home for Girls	50 00
Walker, Thomas S., Summer Charities	10 00
"Walnut," Summer Charities	10 00
Walton, G. A	10 00
Warburg, F. M	50 00
Warburg, F. M., October 14th	50 00
Warburton, Frederick J., Summer Charities	25 00
Ward, J. G., Summer Charities	10 00
Ward, Owen	1 00
Ward, Sidney	5 00
Wardwell, William T., Summer Charities	20 00
Waring, Mrs. Charles B., Summer Charities	10 00
Warner, J	20 00
Warner, James Ward	5 00
Warren, E. Kunhardt, Emigration	25 00

Warren, Mrs. Edward Walpole, Emigrant	$25 00
Washburn, John H., Summer Charities	25 00
Washburn, William Ives	10 00
Washburn, William Ives, Summer Charities	10 00
Washington, W. deH	1 00
Watson, Miss E. G., School for Crippled Children	2,150 00
Wead, Edward N	10 00
Wead, Edward N., Summer Charities	10 00
Webb, F. Egerton	10 00
Webb, F. Egerton, Summer Charities	15 00
Webb, H. St. John	5 00
Webb, H. St. John, Summer Charities	10 00
Webb, Mrs. Seward, Christmas, West Side Italian School	100 00
Webster, C. B	10 00
Webster, Mrs. Hamilton Fish, Henrietta School	20 00
Weed, Mrs. George E., 53d Street School	5 00
Weed, Harold L	1 00
Weekes, F. Delano, Summer Charities	50 00
Weeks, A. A	25 00
Weeks, A. A., Summer Charities	50 00
Weil, L. J., coal	100 00
Weil, L. J., Emigration	20 00
Weir, W. B., Summer Charities	25 00
Weiser, C. J	5 00
Welch, David	5 00
Welch, David, Summer Charities	5 00
Welling, Mrs. C. H	25 00
Wells, Miss Julia Chester, Emigration	250 00
Wertheim, H. P	25 00

Wesendonck, Walter	$10 00
Wesendonck, Walter, Summer Charities	10 00
Wessells, Frank C.	40 00
Wessells, Frank C., Summer Charities	50 00
West End Collegiate Guild, Henrietta School	10 00
Westcote, W. J., Summer Charities	5 00
Wetmore, C. W., Summer Charities	30 00
Wharton, Charles A.	10 00
Wheeler, Charlotte P.	5 00
Wheeler, Mrs. J. Davenport, Summer Charities	100 00
Wheeler, Prof. James R.	5 00
Wheelock, Dr. George G., Elizabeth Home Annex	25 00
Wheelock, Dr. George G., Lord School	5 00
Wheelock, Dr. George G., Newsboys' Lodging House	5 00
Wheelock, Dr. George G., Fifty-third Street School	2 00
Wheelock, Mrs. George G., Henrietta School	55 00
Wheelock, Mrs. George G., Summer Charities	10 00
Wheelock, Mrs. James W., Fifty-third Street School	2 00
Wheelock, William H., Emigration	25 00
Whitall, Tatum & Co., Summer Charities	50 00
Whipple, Mrs. Katharine J.	5 00
Whitaker, Edward G.	5 00
White, Miss Caroline, Summer Charities	10 00
White, E. H.	5 00
White, E. H., Summer Charities	10 00
White, Mrs. Joseph M., special donation, Farm School	4,000 00
White, Mrs. Joseph M., Farm School	911 00
White, Mrs. Joseph M., German School	725 00
White, Mrs. Joseph M., Sullivan Street School	875 00
White, Mrs. Joseph M., Sullivan Street Evening School	338 92

White, Mrs. Joseph M., Fresh Air Fund	$200 00
White, Mrs. Joseph M., Sick Children's Mission	25 00
White, Leonard D., Summer Charities	5 00
White, Miss Mary M., East Side School	10 00
Whitehead, A. Pennington, Summer Charities	10 00
Whitehead, Charles E., Forty-fourth Street School	20 00
Whitehead, Charles E., West Side Italian School	50 00
Whiteley, Benjamin, Summer Charities	10 00
Whiteley, Mrs. Benjamin, Summer Charities	3 00
Whitfield, Miss, Phelps School	5 00
Whitfield, R. P	5 00
Whitman, Nathaniel	25 00
Whitman, Nathaniel, Summer Charities	100 00
Whitney, A. R., Summer Charities	25 00
Whitney, Edward F	50 00
Whitney, Harry Payne, Summer Charities	50 00
Whittemore, H., Summer Charities	5 00
Wickes, Mrs. Edward A., West Side Italian School	10 00
Wickham, D. O., Summer Charities	50 00
Wight, L. A., Summer Charities	5 00
Wilkes, Miss Grace, Sick Children's Mission	20 00
Wilkie, John L	10 00
Wilkie, John L., Summer Charities	10 00
Willcox, Albert	25 00
Willcox, Albert, Summer Charities	25 00
Willcox, Charles H	5 00
Willcox, William G	10 00
Willcox, William G., Summer Charities	25 00
Willets, Martha T	10 00
Williams, E. E	5 00

Williams, George G.	$100 00
Williams, George G., Estate of, Summer Charities	100 00
Williams, Mrs. G. P., Summer Charities	5 00
Williams, H. K. S., Summer Charities	10 00
Williams, Mrs. I. T., Summer Charities	10 00
Williams, James D., Summer Charities	10 00
Williams, John, Summer Charities	2 00
Williams, The Misses, German School	20 00
Williams, William, Summer Charities	10 00
Williams, Russell & Co	20 00
Williamson, A.	4 00
Willis, W. P., & Co	25 00
Wills, Charles T., Summer Charities	5 00
Wilson, Henry B., Summer Charities	10 00
Wilson, Miss Lily, East Side School	10 00
Wilson, Mrs. Orme, Hot Meals	300 00
Wilson, Mrs. Orme, Summer Charities	50 00
Winthrop, Bronson	25 00
Winthrop, Bronson, Summer Charities	25 00
Winthrop, Egerton L.	25 00
Winthrop, Gertrude C.	20 00
Winthrop, Miss Elizabeth W., Mott Street School	15 00
Winthrop, Mrs. Grenville	25 00
Winthrop, Mrs. Grenville, Summer Charities	25 00
Wisner, Percy	10 00
Wisner, Percy, Summer Charities	10 00
Witherbee, Mrs. F. S., Sullivan Street School	75 00
Woerishoffer, Mrs. Anna, Summer Charities	100 00
Woman's Missionary Society, First Presbyterian Church, East Orange, N. J., support of two beds at Summer Home	60 00

Wolff, Lewis S	$100 00
Wood, Mrs. Charles B	100 00
Wood, Fletcher H	10 00
Wood, Gertrude	10 00
Wood, Henry R	5 00
Wood, John H	2 00
Wood, Josephine	10 00
Wood, Miss Julia, Summer Charities	100 00
Wood, Miss Julia, Emigration	20 00
Wood, Miss Julia, Farm School	30 00
Wood, Miss Julia, Hot Dinners	50 00
Wood, Sydney M	10 00
Wood, W. C., Emigration	20 00
Woodhull, J. C	1 00
Woodwell, E. G	2 00
Woolley, J. A	25 00
Woolley, P. M., Summer Charities	25 00
Woolworth, Rev. W. S	5 00
Wray, Miss Julia, Emigration	20 00
Wright, Mrs. G. Granville	100 00
Wright, Mrs. G. Granville, Summer Charities	100 00
Wright, J. Howard, Summer Charities	10 00
Wright, J. R	1 00
Wurts, P. J., Summer Charities	5 00
"X. B.", Summer Charities	5 00
"X. Y.", Summer Charities	10 00
"Y. F. C."	35
"Y. F. J. C."	30
Yeaman, George H	5 00
Yeaman, George H., Fresh Air Fund	5 00

Young People's Society, Unity Church, Brooklyn......	$8 00
Young People's Society, Christian Endeavor, Lenox Presbyterian Church........................	2 00
Zabriskie, Andrew................................	25 00
Zabriskie Andrew, Summer Charities................	25 00
Zabriskie, Christian, Sick Children's Mission........	10 00
Zimmerman, Mrs. J. E., Summer Charities...........	10 00
Zollikoffer, O. F................................	5 00

Miscellaneous Donations.

Adriance, H. F., lot of magazines.

Ahrens, Mrs. H., package of clothing.

Allen, Mrs. J. A., lot of books and magazines.

Anonymous, Hazarville, Conn., 1 box of apples and groceries, etc

Anonymous, 2 barrels clothing, games and toys.

Anonymous, package of toys.

Anonymous, package of magazines.

Anonymous, package of clothing.

Anonymous, 3 packages of clothing and shoes.

Bible Society, Presbyterian Church, Westfield, N. J., 2 barrels toys, clothing, groceries, etc.

Bibby, Mr. W. H., package of clothing and shoes.

Borgfeldt & Co., Geo., 1 case toys, dolls, etc.

Brace, Mr. R. N., package of ties.

Brearley School, 3 packages of pens, pencils and books.

Brower, S. H., package clothing.

Brown, Mrs. F. G., lot of books.

Burgess, J. L., package of clothing.

Calman, Mrs. E., 3 packages of new clothing.

Chapin, Mrs. B., package of toys.

Children's Fold, The, 3 cases of clothing, hats, bedding, etc.

Christian Endeavor Society, First Presbyterian Church, Bordentown, N. J., 2 boxes magazines, etc.

Churchill, Mrs. A. V., package of clothing.

Comstock, A., box of toy mirrors.

Crosby, Mrs. E. W., package toys, games, books.

Dodge, C. H., package of bathing suits.

Dodge, Mrs. M., lot of books and magazines.

Doolittle, L. M., 3 barrels of apples.

Drury, Mrs. L. D., 1 barrel clothing and shoes.

Ellinwood, L. H., 2 boxes of clothing.

Emery, W. S., lot of periodicals.

Endicott, Mrs. R., package of mittens.

First Congregational Church, Franklin, N. Y., 2 barrels and 1 case of clothing.

Friend, Ballston Lake, N. Y., package of clothing.

Friend, at "The Florence," 2 packages of magazines.

Friends at Mamaroneck, N. Y., package of new dresses and underwear.

Friend at 136 W. Seventy-seventh street, box of clothing.

Friend at 191 W. Seventy-ninth street, package of clothing.

Friend at 209 W. Ninety-seventh street, package of clothing.

Friend, 2 waists.

Friend, package of clothing.

Friend, package of clothing.

Friend, package of shoes.

Friend, package of new dresses.

Gould, Mrs. E., 1 case and 3 packages of toys, etc.

Hall, Miss M. J., package of periodicals.

Hall, Mrs. W. H., 3 packages of clothing, shoes, etc.

Hathaway, Mr. L. S., lot of magazines.

Hauselt, Mrs. C. E., package of clothing.

Hellyer, Mr. H. A. C., package of clothing.

Hersey, Mrs. J., package of calendars, books, etc.

Holloway, Mr. L. H., 2 packages of books and clothing.

Holt & Co., 1 barrel of flour.

Hoyt, Miss G. R., package of books, games and toys.

Hoyt, Mrs. W. S., package of new dresses and underwear.

Hunt, Mrs. K. D., 2 packages of books.

Ingersoll, W. H., 1 box of clothing.

Iredell, Misses, 2 boxes of toys, books, etc.

Kahler & Sons, Dr. P., 2 boxes of new shoes and rubbers.

King's Daughters and Sons, Bull Run, N. Y., package of new clothing.

Kissell, Mrs. G. G., 2 packages of clothing.

Koechl, Mr. V., 1 portable house.

Lady, 5 new scarfs.

Lady, 6 pair of new gloves.

Lady, package of periodicals.

Lady, package of shoes.

Linton, Miss L. L., package of clothing.

Littlejohn, Mrs. F. B., package of clothing.

Machen, Mrs. C. W., package of clothing.

Macy, Mrs., 3 packages and 1 box of books, clothing, bedding, carpets, etc.

Mason, Miss S. C., package of magazines.

Mayer, M. & C., package of gloves.

McIntyre, Miss E. C., 2 packages of toys and clothing.

Needlework Guild, Pelham Manor Branch, large package of clothing.

O'Neill, R. C., package of clothing.

O'Neill & Co., H., package of new clothing.

Parker, H. W., package of clothing.

Plummer, Miss E., 2 packages of magazines.

Pollinger, J., package of clothing.

Potter, Mr. J. B., 3 packages and 1 valise of clothing.

Powles, Mr., package of clothing.

Renwick, Mrs., package of new scarfs.

Reynolds, Misses, 3 boxes of books and casts, lot of desks, chairs, maps, etc.

Scarborough Presbyterian Church, 1 case of toys.

Scofield, Mrs. E., 5 packages of clothing and shoes.

Schwab, Mrs. H. C., lot of books and toys.

Seaman, Mrs. F. A., 1 box of clothing.

Slauson & Co., A., 2 pails of candy.

Southack, Mrs. F. F., 3 packages of shoes and clothing.

Springfield Presbyterian Church, L. I., 2 barrels and 3 boxes of toys, books, clothing, etc.

Sunday School, Congregational Church, Clinton, Conn., 1 box of clothing.

Sunday School, Congregational Church, Monson, Mass., 1 box of books, clothing, etc.

Sunday School, Congregational Church, Windsor Locks, Conn., 1 case of candy, books, clothing, etc.

Sunday School, Lima, N. Y., books, toys, clothing, etc.

Sugen, E., package of clothing.

Symington, Miss A., 1 box of clothing.

Thayer, Mr. H. B., 1 trunk of toys, books, clothing, etc.

Thompson, Mrs. R. N., hamper of clothing, ornaments, etc.

Treveres, Mr. J. J., package of clothing.

Tuck & Sons Co., Raphael, 2 cases of books, pictures, picture cards and calendars.

Van Boskerck, Miss, package of pictures.

Vandyke, H., package of periodicals.

Verdi, Mrs. C. M., 4 packages of magazines and 1 package of clothing.

Walsh, Mr., package of picture cards, books, etc.

Ward, Miss, package mittens.

White, Mrs. J. M., 2 packages of socks.

Williams, F., 2 packages of clothing and hats.

Wright, Miss M. V. D., lot of "Outlooks."

Donations Received at Elizabeth Home.

Cutting, W. Bayard, for Thanksgiving dinner.........	$32 97
Jackson, Mrs. F. Walcott...........................	5 00
Lawrence, Mrs. E. J............................	5 00
Reynolds, Mrs................................	1 00
Stimson, Mrs. E. P., for ice cream during hot weather..	20 00

Ambrose, Miss, 2 waists.

Bush, Mrs., 3 packages of second-hand clothing.

Borgfeldt & Co., package of books and picture frames.

Blanchard, Miss, 4 hats, 8 shirt waists, second-hand.

Calman, Mr. E., 2 barrels apples.

Condory, Mrs., 2 parcels of second-hand clothing.

Dana, Mrs. A. Carroll, 33 yards red flannel, 2 pieces of unbleached muslin, 3 dozen pairs fleece lined stockings.

Dunlop, Robt., Christmas cakes, Easter buns.

De Barry, Fred, 1 box of oranges.

Ernst, Mrs. H. S., bag of second-hand clothing.

Fackle, Mrs. D. P., box of shoes.

Fruit and Flower Mission, 2 baskets of vegetables, 2 boxes of red currants.

Friend, A, 2 flannel waists.

Horne, Miss F. M., barrel of second-hand clothing.

Holt & Co., barrel of flour.

Higginson, James J., 2 barrels apples.

Howe, John I., 36½ pounds oat germs.

Henry, Mrs. Douglas, 12 prizes, ice cream and cake.

Hospital Book and Newspaper Society, package of magazines and books.

Leadwith, Miss, 1 skirt, 1 jacket, 1 suit.

Macy, Mrs., bundle of second-hand clothing.

Potter, the Misses, 3 barrels of apples.

Roselle Hotel Supply Co., 1 goose.

Reese Bros., bottle of pickles.

Radcliffe, Mrs., second-hand waists and jackets.

Remington Typewriter Co., map of the world.

Stanwood, Mrs., bag of second-hand gloves and handkerchiefs.

Stimson, Mrs., ice cream, cake, candy bag.

Schnell, Mrs., shoes, ribbons, gloves.

Slauson, A., 2 pails of candy.

Tod, Mr. J. Kennedy, 4 barrels of apples.

Wheeler, Miss E. M., barrel of apples, pears, etc.; ice cream, cake and strawberries for Decoration Day; sent 36 girls to the park; 1 barrel apples.

Donations Received at Newsboys' Lodging House.

Bliss, Mrs. G. T.	$5 00
Busy Bee Club	3 50
Cary, A. L.	5 00

Cammann, E. C.	$25 00
Holmes, Anthony	2 00
Hathaway, W. T.	1 00
Kissel, G. E.	100 00
March, Clement	300 00
Schenck, C. W.	1 00
Warring, Vectem	1 00

Alexander Chapel, a case of groceries.

Blythe, Mr., a bundle of clothing.

Dates, Mrs. G. S., a bundle of clothing.

Fisher, Mrs. A. H., 16 pairs of stockings.

Goff, F. W., 1 barrel of apples.

Howell, William P., a case of fireworks.

Jessath, Mrs. T., 2 bundles of clothing.

Lady, A, a woolen scarf, ties and books.

Mitchell, W. P., 2 bundles of clothing.

Wells, H. C., clothing.

Donations Received at West Side Italian School.

Cutting, W. Bayard, for Christmas	$60 00
Goelet, Mrs. Robert, for Christmas	125 00
Gracie, James K., for Christmas	10 00
James, D. Willis, for Christmas	50 00
Kissel, Gustav, for Christmas	10 00
Kissel, Mrs. Gustav, for Christmas	10 00
Montclair Infant Class, Presbyterian Sunday School	1 00
Montclair Infant Class, Presbyterian Sunday School, for Christmas	4 00
Roosevelt, Mrs. James A., for Christmas	125 00

Roosevelt, Mrs. James A., for shoes	$50 00
Roosevelt, Mrs. James A., for shoes	50 00
Robinson, Douglas, for Christmas	10 00
Robinson, Mrs., for shoes	25 00
Russell, A. D., for Christmas	10 00
Russell, Mrs. A. D., for Christmas	15 00
Rickard, Miss, for Christmas	10 00
Webb, Mrs. Seward, for Christmas	100 00
Weston, Miss Helen, for Christmas	20 00
Whitehead, C. E., for Christmas	50 00
Willcox, Mrs. William	10 00

Baldwin, Miss Louise, and friends, doll house.

Bowlker, Mrs., Thanksgiving dinner.

Montclair Sunday School, Presbyterian Church, No. 1, provisions and Christmas dinners for thirty families.

Roosevelt, Mrs. James A., ice cream and cake treat Easter and closing day; large box of fancy cards and toys.

Roosevelt, Mrs. Theodore, box of stereopticon views.

Schlegel, Mrs. Charles, 4 bundles of clothing.

Schwarz, Mrs. William, 4 bundles of clothing.

Schwarz, Henry Stanley, class motto.

Storey, Mrs. James Vaughan, 1 package of baby shoes.

Trenchard, Mrs. Edward, 3 large bundles of clothing.

Donations Received at Duane Street School.

Friends, for ice cream	$10 00
Johnson, Miss E., for Christmas	5 00
Sharp, Mrs. J., dolls for Christmas	5 00

Boughton, Mrs. Fanny, dolls for Christmas.

Friend, a bundle of clothing.

Friends, some magazines and books, dolls for Christmas.

Harrison, Miss S., a bundle of clothing.

Heig, Mrs. R., some children's clothing.

Johnson, Miss E., flowers for the children; 4 pairs shoes.

Kaeppel, Mrs. B. M., 8 dozen pairs mittens; dolls and toys for Christmas, and several packages of clothing, shoes, etc.

Needlework Guild, New York City Branch, package of new clothing.

Needlework Guild, Upper Montclair, package of new clothing.

Sharp, Mrs. J. S., coffee and cakes for three mothers' meetings; 2 pairs shoes.

Donations Received at East River School.

Billings, Miss Mary M., Thanksgiving dinner	$82 12
Bethel Sunday School, East Orange, N. J	10 00
C. A. S., special	50 00
Dwight, Mrs. H. W	10 00
Delano, Mrs. F. H. (through Mrs. Ward)	10 00
Friend, for board for a boy for a week at camp	3 00
Gerry, Mrs. E. T	150 00
"Jimmy"	3 00
Riegel, Mrs. John L., of Riegelsville, Pa.	10 00
Whithead, Mrs. Charles (in memory of)	20 00
Ward, Mrs. George Cabot	10 00

Board of Ladies, shirtwaists for the boys and dresses for the girls of all the classes but the highest; toys for all the boys; ice cream treat for the entire school.

Bowdoin, Mrs. Temple, daintily dressed dollies for all the girls; mechanical singing bird; dolls for sewing classes to dress, and supplies for chair-caning class.

Bethel Sunday School, East Orange, N. J., a large case of toys, books, clothing, etc.

Brown, Mrs. William Reynolds, a picnic for 25 boys at her summer residence at White Plains; turkeys for three poor families at Thanksgiving.

Billings, Miss Mary M., a Thanksgiving dinner to the school.

Dwight, Mrs. H. M., "two specimens" for cabinet; a number of Indian picture cards.

Gebhardt, Mrs. Edward F., of Shelburne Farms, Vt., wild flowers in blossom for window boxes; several nests for principal's cabinet.

Harper, Mrs., 19 baby dresses.

Hospital Book and Newspaper Co., 2 bundles of books, etc.

Hoyt, Miss, 1 box of books.

McCarroll, J. R. T., a collection of toys.

Schwarz, Mrs. Luise A., a bundle of clothing.

Van Boskerck, 12 knitted caps; 2 pairs mittens.

Ward, Mrs. George Cabot, dresses and boys' shirts for highest class at Christmas.

Sampson, Miss, a silver medal for best sewing.

Ledyard, Mr. and Mrs. L. Cass, a Christmas treat and presents for 100 children.

Donations Received at Children's Annex.

A Friend, 20 purses, 10 pennies each.

H. H. Miller, Pennsylvania, box of toys.

Mr. Neill, baby garments.

Berkley School, benches.

Mrs. Millar, New York, night dresses.

Mrs. Underwood, New York, dresses and skirts.

King's Daughters, Warwich, N. Y., clothing.

Mrs. E. L. Brace, dresses.

Mrs. Calman, garments.

Pelham Manor Branch Needlework Guild, towels and garments.

Children's Fold, box of clothing.

Mrs. Seton, toys and books.

Mr. Tod, apples.

E. L. Brace, magazines.

Through Sun Office, pictures, clothing, wearing apparel, caps and hats, handkerchiefs, vest, stockings and hat.

Donations Received at Henrietta School.

A Friend, for coal, etc	$20 00
A Friend, for coal	20 00
A Friend, Christmas	1 00
A Friend, Christmas	1 00
Bottsford, Miss S., Christmas	5 00
Carnegie, Mrs. Andrew, Christmas	25 00
Crosby, Mrs., Christmas	5 00
Dean, Mrs. H. H., Christmas	5 00
Dow, Mrs. A., Christmas	5 00
Flammers, Mrs., two boys, Christmas	5 00
Gerry, Mrs. E. T., Christmas	250 00
Hepburn, A. B., Christmas	30 00
Holt, Mrs. L. M., Christmas	10 00
Moore, Mrs. Albert, boys' camp	5 00

Morgan, Mrs. J. P., Christmas	$10 00
Phillips. Mrs. G., Christmas	10 00
Potter, Mrs. Henry C., Christmas	20 00
Rockhill, M. C., Christmas	5 00
Strauss, Mrs., Christmas	3 00
Smelie, M. E., Christmas	10 00
Smith, Mrs. J., Christmas	5 00
Sawyer, Mrs., Christmas	2 00
Sunday School in Glastonbury, Christmas	4 05
Sunday School in Walton, N. Y., Christmas	4 25
Stone, Mrs. A. B., Christmas	5 00
Thaw, Dr. A. Blair, dinners	450 00
Thaw, Dr. and Mrs. A. Blair, Christmas	100 00
Thaw, Dr. and Mrs. A. Blair, cooking class	75 00
Thompson, Mrs. R. M., Christmas	5 00
Wheelock, Mrs. G. G., Christmas	10 00
Wheelock, Mrs. G. G., worthy poor	60 00

Bovinine Company, 1 box.

Booth, Mrs., magazines and shoes.

Botsford, Miss S. H., box of books, toys, dolls.

Claflin, H. B., box of underwear.

Cullman, Mrs. J. F., clothing.

Dolan, Miss Lizzie, doll.

Dorr, Miss E. L., toys, clothing.

Erlanger, Miss A. Louise, box of nuts, raisins.

Fuller, Mrs., toys, games.

Gumbrecht, Misses Maggie and Florence, box of toys.

Harting, Mrs. C., toys.

Hepburn, Mrs., clothing, sandwiches.

Huyler, Mr., candy at Christmas.

Hospital Book and Newspaper Society, reading matter.

Kaufman, Mrs. G., toys.

Kobbe, Mrs., 2 bundles of clothing.

King's Daughters, Mrs. Ellerbrook's, 2 bundles of clothing.

Levy, Mrs. Walter, 21 dolls, box of worsted garments.

Little, Mrs. John, games, toys, books.

Morgan, Mrs. S. A., dolls.

Maine, Miss E., 3 large dolls.

Morewood, Miss E. D., toys, games, dolls.

Moore, Mrs. A. S., box of clothing.

Macy, R. H., 25 pounds of candy.

Macy, Mr., clothing, magazines.

Ogden, Miss M. E., doll.

Parsons, Miss Grace, Thanksgiving dinner to 20 families.

Peck, Miss, 2 bundles of clothing.

Pell, Miss Gertrude, 35 toys, 15 dolls, candy.

Pratt, Miss Constance, candy.

Rolli, Mrs. A. P., 2 boxes of clothing, 1 bundle underwear.

Rockhill, Mrs. C., toys.

Strong, Rev. George, toys.

Southback, Mrs. A. G., chairs, toys, clothing.

Schwab, Mrs. H. B., toys.

Stafford, Mrs., large bundle of clothing.

Symington, Mrs. A., clothing.

Thompson, Mrs. R. M., dolls, candy.

Wheelock, Mrs. S. S., 3 large pictures, 5 dozen aprons, 5 dozen shirts.

Williams, Mr. S. H., soap, toys, clothing.

CLASS FOR CRIPPLES.

Burke, Miss Edith Lee, 6 dresses, 2 skirts.

Callahan, Mrs., 7 pairs of drawers.

Guild of Darrach Home, prizes for children.

Guild, Flower and Fruit, jelly.

Gordan, Miss Ellen, jelly.

Hess, Mr. M., 4 dozen cups.

Lewis, Alfred, ice cream treat.

Parsons, Miss, flowers.

Randell, Mrs., blackboard.

Wheelock, Mrs. G. G., needles, worsted.

West End Collegiate Guild, Boys' Camp	$10 00

Donations Received at Fifty-third Street School.

Bell, Enoch C., Christmas	$10 00
Bell, John J., Christmas	10 00
Codet, Mrs., shoes	50
Crommelin, Mrs. E., shoes for poor woman	2 00
Friend, A., for shoes	3 00
Gentle, Mrs. J., for shoes	5 00
Gentle, Miss Janet, for shoes	2 00
King's Circle, Here a Little, There a Little	5 00
Lowrey, Mrs. G. C. W., Christmas	5 00
Lowrey, Mrs. G. C. W., car fare to 15 women at Christmas	4 00
Ross, Theodore, Christmas	5 00
Stevenson, Mrs. S. M., Christmas	5 00
Smith, Mrs. Thomas, Christmas	10 00

Sheldon, Mrs. Clarence, Christmas	$10 00
Tallcot, Mrs. Herbert, shoes	5 00
Wheelock, Dr. George G., poor	2 00
Wilkie, John L., Christmas	10 00
Young People's Society, Munn Avenue Presbyterian Church, East Orange, boys at camp	24 00

Brown, Mrs. W. H., 2 large parcels clothing.

Cornell, Mrs. Stephen W., 2 large boxes clothing.

Eagleson, Mrs. George F., Christmas dinners to 15 families, 15 pounds candy, 50 fancy baskets and boxes.

Farquhar, Mrs. A. L., 1 barrel clothing.

Huyler, Mr. John, 20 pounds candy.

Knauth, Mrs. Percival, 4 boxes clothing.

King's Circle, Here a Little, There a Little (through Miss Haight), 20 new garments.

Ladies' Society, West Farms Presbyterian Church, 75 garments.

Nichols, Mrs. G. L., 7 boxes clothing and shoes.

Pirnie, Miss, 1 box toys.

Tyers, Miss, 2 boxes clothing.

Teachers of school, part care of consumptives' children.

Underhill, Mrs. Edward, large bag clothing.

Donations Received from Central Presbyterian Church.

Brush, Mrs. C. F., Christmas	$5 00
Brown, Mrs. S. Q., Christmas	5 00
Cragin, Dr. E. B., Christmas	5 00
Friends, Christmas	4 00

Hoyt, Dr. Ezra P., Christmas	$15 00
Inslee, Mrs. Samuel, Christmas	5 00
Moses, Mrs. James, Christmas	1 00
Munro, John, Christmas	10 00
Pirnie, Miss, Christmas	2 00
Reid, Mr. Willard	5 00
Smith, Rev. Wilton Merle, Christmas	5 00
Schoonmaker, Mr., Christmas	1 00
Wheelock, Mrs. James, Christmas	2 00
Weed, Mrs. Geo. E., Christmas	5 00

Donations Received at Sullivan Street School.

Bruce, Miss M. W., boys' suits, Christmas	$150 00
Bruce, Miss M. W., candy, day and evening school	22 00
Bruce, Miss M. W., turkey	10 00
Bruce, Miss M. W., boys' camp	70 00
Egan, Mrs. D., Christmas	10 00
Green, G. T., Jr., Christmas	5 00
Hamersley, Mrs. J. Hooker, Christmas	15 00
Hamersley, Mrs. J. Hooker, sewing	22 60
N. and H., sick	10 00
Rhinelander, Miss S., kindergarten	275 00
Rhinelander, Miss S., poor	200 00
Rhinelander, Miss S., Christmas	30 00
Robinson, Douglass, Christmas	15 00
Shortland, Mrs., Christmas	10 00
Stinson, Mrs. D., Thanksgiving	10 00
Stinson, Mrs. D., Christmas	10 00
Thompson, Mrs. R. J., Christmas	50 00

Witherbee, Mrs. F. S., Christmas, toys	$75 00
White, Mrs. J. M., visiting and poor	350 00
White, Mrs. J. M., boys' suits, Christmas	150 00
White, Mrs. J. M., candy, day and evening school	20 00
White, Mrs. J. M., knives, baskets and turkey	25 00
White, Mrs. J. M., material for sewing	40 00
White, Mrs. J. M., sewing	50 00
White, Mrs. J. M., boys' camp	45 00
White, Mrs. J. M., evening school	15 00

Bruce, Miss M. W., 25 hoods.

Busy Bee Club, through Miss Katherine L. Hamersley, 7 flannel skirts.

Brick Presbyterian Church Sunday School of Orange, New Jersey, 45 potted plants.

Baxter, Mrs., 12 gingham dresses.

Benton, Mrs. Amos, knit 12 pairs of mittens.

Dunham, James Co., large bundle of sample pieces.

Griffeth, Mrs. M., 6 books for prizes, 22 hoods, 21 aprons, 3 pairs of stockings.

Hamersley, Mrs. J. Hooker, 4 pieces outing flannel, 20 yards muslin, 2 dozen spools cotton, 2 papers pins, 2 dozen papers of needles, 4 boxes of buttons, 1 bundle of second-hand clothing.

Johnson, C. S., large bundle second-hand clothing.

Meeker, Mrs., 12 flannel skirts.

Odds and Ends Society of Montclair, 8 large bundles of new and second-hand clothing.

White, Mrs. C. R., 12 handkerchiefs.

White, Mrs. J. M., 2 barrels of apples, Christmas greens, 22 hoods, 10 pieces of gingham, 2 pieces of muslin.

Donations Received at Jones Memorial School.

Cutting, Bayard	$25 00
Jones, James H., shoes and clothing	150 00
Jones, James H., shoes, poor	150 00
Jones, James H., special	150 00
Jones, James H., sewing department	50 00
Jones, James H., groceries and coal	100 00

C. A. B., 1 bundle of clothing.

Friend, 10 quarts of ice cream (evening school).

Needlework Guild, 75 garments.

Anonymous, bundle containing 15 garments.

M. B., 1 girl's coat and 1 hat.

Donations Received at Mott Street School.

James, Mrs. D. Willis, for Christmas, clothing and shoes	$300 00
James, Mrs. D. Willis, for ice cream treat	50 00
James, Mrs. D. Willis, hot dinners during the winter	286 21
Travers, Miss Susan, for sending 40 boys to camp	120 00
Travers, Miss Susan, hot dinners during the month of November	73 00
Travers, Miss Susan, for tree, greens, candies, at Christmas	66 11
Carll, Miss C. J., for Christmas	30 00
Children's Day, Congregational Sunday School, Brookfield Center, Conn., sending delicate children to country	10 00

Brick Presbyterian Church, East Orange, Children's Day, 70 potted plants.

Ladies' Auxiliary, Riverdale, N. Y., 9 aprons, 2 flannel skirts with waists, 9 waists, canton flannel, 8 dresses, 1 skirt, 5 combination suits, 9 drawers, 11 underwaists.

Rickard, Mrs. R. H., and Drake, Miss Mary C., 6 flannelette skirts without waists, 1 flannelette wrapper, 3 pairs of drawers with waists, 2 dresses, 1 pair of flannel drawers, 1 flannel skirt, 2 knitted sacques, 5 hoods, 13 pairs of mittens.

Sturdevant, Mrs. H., 55 pairs of mittens.

Ludlum, Mrs. Chas., 19 pairs of mittens.

Salmons, Miss Sarah, 2 bed quilts (made from samples from Jas. Dunham & Co).

Unknown, 12 pairs of mittens.

Davidson, Mrs. J. E., 6 flannel skirts without waists, 2 blankets.

Long, Mrs. J. D., 3 hats, large bundle of old clothing.

Travers, Miss Susan, Christmas toys and gifts, 94 dolls, 84 china tea sets, 41 pewter tea sets, 22 stoves, 21 toy kitchens, 12 books, 2 pairs of scissors, 1 knife, 14 foot balls, 122 drums, 37 trains of cars, 20 trumpets, 12 Noah's Arks, 28 tenpins, 8 bags of marbles, 3 harmonicas, 500 tree ornaments.

New York Library, Circulating Department, loan of 25 nature books monthly.

Donations Received at the Forty-fourth Street Boys' Home.

Bliss, Mrs. George T., special dinner..................	$58 63
Dodge, Cleveland, gymnasium material..............	12 00
Dodge, Mrs. Wm. E., Thanksgiving dinner............	60 01
Dodge, Mrs. Wm. E., Christmas dinner..............	63 76
Dodge, Mrs. Wm. E., shoes and clothing..............	20 00

Dwight, Miss M. V., one package of reading matter.

Grannis, Mrs. F. W., two packages of reading matter.

Higginson, J. J., several barrels of apples.

Hudson, W. H., one barrel of apples.

Lovell, Mrs. M. E., several packages of reading matter.

Monday Sewing Class, 100 flannel shirts.

Patton, A. C., one large package of reading matter.

Spaulding, Mrs. A. W., several books for the Levi S. Robinson Memorial Library.

Tod, Wm. Stewart, four barrels of apples.

Wendell, Evert Jansen, games, prizes and gymnasium material.

Donations Received at West Side Lodging House.

Bliss, Mrs. Geo. T., special dinner	$49 73
Gracie, James K., and W. Emlen Roosevelt, Thanksgiving dinner	45 31
Robinson, Douglas and friends:	
Christmas dinner	52 51
Flannel shirts	45 75
Robinson, Douglas, Spring dinner	43 19

Adriance, H. E., magazines and books.

Borden's Condensed Milk Co., 20 quarts of milk.

Horton, Seymour, 20 quarts of milk.

Christ's Church Orchestra, fine musical entertainment and lunch for boys.

Christian Police Association, half dozen chairs.

Depew, Edward & Co., case of oranges.

Graham, Mrs. Dr., several fine packages of books, magazines and papers.

Hallock, Charles, 2 barrels of apples.

Ladd, William, 1 barrel of apples.

Weekes, F. Delano, 100 lbs. of candy.

Tod, Wm. Stewart, 4 barrels of apples.

Donations Received at Sixth Street School.

Curie, Charles	$10 00
Cutting, W. Bayard	50 00
James, D. Willis	20 00
Sloane, Mrs. William D	350 00

Benjamin, Mrs. Eastburn, 11 mufflers, 24 blouses, 30 flannel skirts, 54 dresses, 13 pairs drawers, 20 pairs trousers, 3 dozen woolen vests, 2 dozen stockings, 2 petticoats, 22 flannel waists.

Rhoades, Miss Henrietta, 11 flannel dresses, 6 flannel blouses, 12 flannel skirts, 2 toboggan caps, 4 boys' caps, 9 pairs trousers, 6 pairs gloves, 6 pairs wristlets, 24 pairs stockings, 6 pairs boys' underwear, 10 boys' shirts, 40 Christmas cards, 8 pairs drawers, 10 under-waists, 6 books, 6 dolls, 3 kaleidoscopes, 2 bags marbles, 2 jumping ropes, 2 horns, 1 box blocks, 2 musical tops, 2 pairs horse reins, 2 pairs skates, 4 harmonicas, 8 pairs drawers, 6 chemises, 3 flannel waists, 14 handerchiefs, 43 Easter cards.

Ten Broeck, Miss, 22 flannel skirts, 6 flannel blouses, 36 dresses.

Benjamin, Mrs. Eastburn, Rhoades, Miss Henrietta, Ten Broeck, Miss, 320 filled cornucopias, at Christmas.

Sloane, Mrs. William D., Christmas and Thanksgiving dinners.

Donations Received at Tompkins Square Industrial School.

Avon Literary Circle	$6 00
James, D. Willis	397 70
Rogers, Mrs. J. Warren and friends	7 00
Snyder, Mrs. C. Henry	5 00
Tribune "Sunshine Club"	10 00

A Friend, 1 bundle clothing.

A Friend, 1 bundle clothing.

A Friend, 1 dozen pairs mittens.

Heyer, Mrs., 1 bundle mittens.

Kling, Mrs., 8 new articles clothing.

Donations Received at East Side School.

Auchmuty, Mrs. R. T.	$75 00
Armstrong, Mrs. J. Sinclair	35 00
Cutting, Mrs. W. Bayard	25 00
Edwards, Miss Laura Jay	5 00
Gerry, Mrs. Elbridge T.	350 00
Lawrence, Cyrus J	5 00
Mitchell, William	20 00
Schiff, Jacob H	25 00
Steward, John, Thanksgiving	50 00
Steward, John, Christmas	80 00
Steward, John, vacation treat	52 85
Steward, John, prizes	23 37
Steward, John, boys' camp	90 00
Wilson, Misses N. and L.	10 00
White, Miss Mary M.	10 00

Armstrong, Mrs. J. Sinclair, two boxes of clothing.

Beers, Miss Edith, box of toys.

Ginsberg, Mrs. Victor, barrel of apples.

Goldman, Mrs. H., three plants.

Macy, Mrs. T. H., bundle of clothing.

Sick Children's Mission, six boxes of flowers.

Worthington, Mrs. C. C., one flag.

Donations Received at the German School.

Cutting, W. Bayard	$25 00
Friend, for out-door poor	40 00
Gerry, Mrs. E. T.	75 00
Horton, Mrs. Frances	1 00
Perkins, Miss	1 00
Speyer, Mr. James	100 00
Williams, Misses	20 00
White, Mrs. J. M., to give employment	200 00
White, Mrs. J. M., for Christmas toys	25 00
White, Mrs. J. M., for hot dinners	....

Bruce, Miss, 8 children's hoods.

Borgfeldt & Co., 3 dozen dolls.

White, 2 barrels apples and 30 hoods.

Donations Received at Avenue B School.

Decker, W. F., for poor	$100 00
Friend, through Miss Fisher	1 00
Iredell, Mrs. F. W.	10 00

Byrgfeldt & Co., 2 packages of toys and dolls.

Decker, W. F., set of tools and material for carpentry class, 6 pyrographic outfits, 2 chairs for caning, 2 barrels apples.

Draper, Miss, 6 Thanksgiving baskets, 12 Christmas baskets, 3 boxes groceries, 4 boys' suits, 12 pairs shoes, 8 dresses, 12 pairs drawers, 12 underskirts, 24 handkerchiefs.

Hopkins, Miss J. C., 6 dolls.

Iredell, Misses Frances and Eleanore, 2 boxes toys and candy.

Littlejohn, Mrs. M. B., 1 bundle clothing.

Smith, Mrs. C. J., flowers once a week during the summer.

Sunday School, Lima, N. Y., box clothing, shoes, books, toys.

Weekes, F. Delano, ice cream treat.

Donations Received at the Tompkins Square Boys' Lodging House.

Cary, A. L.	$5 00
Cutting, W. Bayard, for Christmas dinners	50 00
James, D. Willis, for Thanksgiving dinners	113 23
Larocque, Joseph, for Christmas dinners	25 00
Larocque, Joseph, for special dinner for the boys	26 18

Dodge, Wm. Murray, package of books and magazines.

Fleishman's Bakery, 20 loaves of bread.

Keen, C. Ross, clothing and shoes.

Rockwell's Bakery, 23 loaves of bread.

Tod, J. Kennedy, 4 barrels of apples.

F. C. White's Bakery, 6 dozen hot cross buns.

Donations Received at the Lord Memorial School.

Lord, Mrs. George de Forest, for Christmas	$100 00

Donations Received at Rhinelander School.

Cutting, Mrs. Bayard	$20 00
Cutting, Bayard	50 00
Gerry, Mrs. E. T.	150 00
Watson, Miss	150 00

Allebons, Mrs. J. O., flannel, dolls, books, fruit.

Andrews, Mrs., picture books.

Dyer, Miss, flannel underclothing.

Huyler, Mr. J., 50 pounds candy.

Lilianthal, Miss, 2 boxes clothing.

Needlework Guild, 78 articles of clothing.

Tribune "Sunshine Society," books, toys.

Donations Received at Italian School.

1902-1903.

Morgan, Mrs. J. Pierpont, Christmas dolls	$68 00
Morosini, G. P., Christmas entertainment	100 00
Morosini, G. P., boys' brigade	15 00

Merrick Junior Branch, box of loose flowers.

Sunday School, Presbyterian Church, Orange, N. J., 42 potted plants.

Donations Received at Health Home.

F. A. Erzinger	$6 50
H. Grashorn	5 00
D. Haase	5 00
Leith & Co	3 00
Loesing & Son	10 00

Wm. B. Lake	$5 00
Geo. Lockitt's Sons	10 00
A. D. Matthews' Sons	10 00
Coney Island Pharmacy	2 00
F. Semken	5 00
Miss E. Burtis	2 00
Miss Whittaker	5 00
William A. Hall	50

Ready Circle, King's Daughters, Mamaroneck, N. Y., package clothing.

The "Neighbors," New Utrecht, N. Y., package clothing.

Women's Missionary Society, Reformed Church, Fordham, N. Y., package clothing.

William Leith, flowers.

Donations Received at Summer Home.

Candy treat every week from fund established by Mrs. M. A. Stone.

Friend, candy for the children.

Mrs. Hawley, bundle of clothing.

Large bundle of clothing and toys from Fort Hamilton (no name given).

Mrs. Israel, large box new toys.

Miss Odjers, a quantity of candy.

Mrs. Lemon, bundle of clothing and shoes.

Miss Purdue, large package of clothing.

Miss Olive Purdue, large bundle of clothing.

Needlework Guild, 200 garments.

Mrs. Koster, two bundles of clothing.

Hotel Horton, cream and cake, August 10th.

Willowmere, ice cream, August 24th.

Willowmere, ice cream and cake, July 20th.

Florence House, treat of candy, fruit, toys and entertainment by guests.

Lowry House, July 29th, candy treat.

Lowry House, August 3d, ice cream and cake, money collected by Mrs. Feltenheim.

Mrs. M. A. Stone, $8 added to candy fund.

Donations Received at Pike Street School.

Boughton, Mrs. H. L., per, for two weeks' outing in the country of 20 children	$100 00
Delafield, Miss J. L., for Christmas	100 00
Delafield, Miss J. L., for sewing class	15 00
Delafield, Miss J. L., for milk	29 00
Gribble, Mrs., for Christmas	10 00
Gerry, Mrs. E. T., for shoes and clothing	125 00
Hoyt, Gerald L., for a day's outing in the country	90 00
Ludlow, M. J. B., for Christmas	5 00
Ladies of the Board, for Thanksgiving	25 00
Ladies of the Board, for picnic	25 00
Pudney, Miss S. J., for an outing for a delicate child	6 00
Screven, Mrs. John H., for Christmas	10 00
Smith, Mrs. G. C., for board of crippled boy in the country	20 00
"Special Gift," for purchase of coal and food	20 00
Townsend, Mrs. Howard, for Christmas	50 00

Lurten, Mr. G. L., for plants	$1 00
Van Ingen, Mrs. E. H., for Christmas	50 00
Winters, Mrs. Joseph E., for Christmas	10 00
Winters, Mrs. Joseph E., for board of sick child in the country	10 00
Wood, Miss Elizabeth, for sick child	2 00
Wood, Mr. W. H. S., for shoes and medicine	2 00

Buckley, Mrs., undergarments, 128 scrap books, pictures, calendars.

Book and Newspaper Hospital Society, large packages of reading matter.

Basset, Mrs., 750 patches for sewing class.

Clark, Mrs., package of clothing.

Colt, Mrs. W. E., ice cream treat at Central Park.

Delafield, Miss J. L., 3 dozen knit stockings, several packages of clothing.

French, Mrs. A., 2,000 patches for sewing class, flannel shirts, skirts, waists, pictures and books.

Fitch, Mrs. and Miss, 104 trimmed hats.

H. O. P. Sewing Society, per Miss Morse, underclothing, dresses, aprons.

Junior Christian Endeavor Society of First Congregational Church of Mt. Vernon, 125 potted plants.

Ladies of the Board, hot dinners every day of the school year.

Lincoln, G. S., 1 dozen potted plants for Arbor Day.

Needlework Guild of America, 95 garments, shoes, hoods, towels.

Osborne, Mrs., 2 dozen pairs children's stockings.

Raven, Mr. A. A., ice cream treat for the children the last day of school.

Screven, Mrs. John, 7 dozen dressed dolls.

Smith, G. C., magazines and children's books.

Smith, Mrs. G. C., complete outfits for 18 girls.

Smith, Mrs. G. C., large packages of partly worn clothing, shoes, toys.

Smith, Miss Dorothy and Master George, cakes for 100 children.

Sunday School of Presbyterian Church, Catskill, N. Y., 12 quilts, underclothing, coats, cloaks, dresses, candy, jelly, toys, books, games and 90 pairs of stockings.

Van Wagenen, Mrs. H. W., Christmas cards.

Winters, Mrs. Joseph E., several packages of clothing, books, pictures, calendars.

Donations Received at West Side School.

Derby, Richard H., Mrs., to cobbling	$10 00
Howland, H. E., Mrs., to sick woman	5 00
Hedden, Mrs. J. E., Jr., to shoes and manual training class	25 00
Livingston, Miss Julia, to poor, candy treat, funeral expenses (Emergency fund)	56 00
Livingston, Miss Clarisse H., to circus tickets	16 50
Morris, Mrs. A. Newbold, cooking class, cobbling and mothers' tea	401 01
Morris, Miss Eva V. C., to poor, cobbling class, circus, ice cream	81 50
Monday Sewing Class, to making garments	78 60
Robinson, Douglas, to shoes	15 00
Robinson, Dr. Beverley, to poor	5 00
Schuyler, Miss Louisa Lee, to salary of teacher of sewing	72 00
Schuyler, Miss Louisa Lee, to Punch and Judy show	5 00

Schuyler, Miss Georgina, to salary of teacher of sewing and Punch and Judy entertainment..............	$77 00
Schermerhorn, Miss Sarah, to Christmas dinners, poor, and ice cream................................	51 93
Schermerhorn, Mrs. William C., to coal..............	10 00
West Side School, to shoe fund......................	88 20

A Friend, 2 books, wall paper samples, 2 dozen mittens.

Board of Managers, spruce tree, 36 balls, 4 harnesses, 60 games, 6 drums, 13 penknives, 29 ties, 12 mirrors, 12 penholders, 12 stocks, 4 (photo) frames, 2 boxes, 13 dozen dressed dolls, ½ barrel potatoes, ½ barrel cranberries, ½ barrel turnips, ½ barrel apples, 8 pounds sugar, 161 small mince pies, 51 large mince pies, 15 loaves bread, 200 pounds turkey.

Baylies, Mrs. Edmund L., 42 gingham shirts.

Cutting, Mrs. W. Bayard, 6 turkeys.

Children's Fold, 24 petticoats, 4 dresses.

Derby, Mrs. Richard H., 15 dinner plates, 2 vases, 5 rolls wall paper designs, 1 lap tablet, 1 picture, 5 pairs shoes, 1 grip, 12 garments, 1 suit men's clothing, 7 boys' shirts, 4 busts of musical composers, 1 pair gloves, 1 photo frame, 1 penwiper.

Emmet, Mrs. Bache, comforters for bed, 1 box beads.

Endicott, Mrs., 4 toys, 1 sled, 1 hoople, 1 desk, 2 boxes toys, 38 books.

Grammar School No. 54, 2 barrels of candy and fruit, 2 bags of clothing, games and books.

Howland, Mrs. Henry E., 1 dozen "Dolly's Library."

Livingston, Miss Clarisse H., 2 brooms, 1 train, 2 horns, 2 Noah's Arks, 1 dust-pan, 2 jumping ropes, 2 cannon, 3 pairs horse reins.

Livingston, Miss Julia, 11 mufflers, 144 trimmed hats.

Morris, Mrs. A. Newbold, 51 new dresses, 12 aprons, 63 quarts ice cream, 230 pounds turkey, ½ barrel apples, ½ barrel potatoes, ½ barrel turnips, 20 quarts cranberries, 15 loaves bread, 7½ dozen cakes, 17 lunch cakes, 10 pounds sugar.

Morris, Miss Eva V. C., 14 library books, 2 brooms, 2 horns, 1 book, 2 tea sets, 2 Noah's arks, 1 train, 2 dustpans, 2 jumping ropes, 2 cannon, 3 pairs horse reins, 4 boxes cut flowers, 63 quarts ice cream.

Monday Sewing Class, through Mrs. Beverley Robinson, 1,621 garments.

Merrington's School, Miss Mary, 1 rag bag.

Needlework Guild of America, through Miss Clarissa H. Livingston, 8 pairs merino drawers, 2 petticoats, 28 merino shirts, 4 pairs stockings, 4 caps, 3 pairs gloves, 3 pairs wristlets, 7 mufflers, 2 pairs pants, 4 shirt waists, 11 pairs drawers.

Norrie, Miss Emily C., 1 scrap album.

Robinson, Mrs. Beverley, 9 pairs shoes, 1 pair skates, 31 copies "Child's Paper," 20 copies "Good Cheer."

Robinson, Miss Pauline, 1 knitted hood, 2 pairs shoes, 24 picture cards, 1 book, 1 photo frame, 1 toy, 1 lap tablet, 1 work basket, package of "Favors."

Stevens, Miss Josephine, 44 petticoats, 2 calendars, 2 tooth brushes, 2 nail brushes, 2 hair brushes, 2 combs, 2 pieces soap, 12 towels.

Schermerhorn, Mrs. William C., 1 Christmas dinner.

Schermerhorn, Miss Sarah, 10 Christmas dinners, 65 quarts ice cream.

Tucker, Mrs. Samuel A., 3 calendars, 1 plant, 19 toys, 1 photo frame, 4 books, 6 dolls, 1 tray, 8 tea cups, 1 rag bag, 3 Easter eggs, 2 pairs shoes, doll's suit, 11 bowls, 2 gowns, 1 bag, 1 box, 7 pictures, 1 statuette.

Thomes, Miss Helen R., 2 blackboards, 2 brackets, 4 ventilators, 1 bag.

Vogel, Mrs. Herman, 7 games, 12 dresses, 43 garments, 6 new dressed dolls, 3 dolls, 1 cushion, 1 pair pants, package of samples, 1 umbrella, 3 hats, 2 rag bags, 1 Afghan, 18 pairs shoes, 1 belt, 5 pairs stockings, 1 costume, 1 hair brush, 6 pairs gloves, 7 toys, 10 books.

Donations Received at Phelps School.

Bliss, Mrs. W. P., special for shoe fund	$25 00
Cutting, W. Bayard, for Christmas	25 00
Chickering, J. J., for Christmas	10 00
Crocker, Mrs. George, for mothers' meetings	15 00
Chappelle, Mrs. H. W., rent for poor woman	10 00
Dodge, Mrs. W. E., Sr., for Christmas	10 00
Dodge, Mrs. W. E., Jr., for Christmas	15 00
Dodge, Mrs. W. E., Jr., special for ice cream treat	10 00
Gerry, Mrs. E. T., for Christmas	100 00
Ledyard, L. C., special for poor	50 00
Mabon, Mrs. J., special for shoe fund	10 00
Stokes, Mrs. A. P., special for hot dinners	200 00
Stokes, Mrs. A. P., special for coal for poor	100 00
Sands, Mrs. P. J., special for hot dinners	50 00
Sands, Miss E., for boys' clothing for Christmas	5 00
Smith, Mrs. A. I., special for shoe fund	10 00
Smith, Mrs. Alexander, special for poor	10 00
Whitfield, Miss, for Christmas	5 00
Unknown friend, through Miss Whitfield	2 00
Unknown friend, through Children's Aid Society, for poor	40 00

Allen, Mrs. J. A., 4 bed spreads, 4 blankets.

Brummel & Co., 10 pounds of candy for Christmas.

Calman, Mrs. E., box of flannel skirts.

Cohen, Mrs., 6 white dresses for kindergarten.

Children's Aid Society, box of clothing, shoes and hats, 3 bundles of clothing.

Endicott, Mrs., 10 pairs of mittens.

Galloway, Mr., 2 barrels evergreens for Christmas decorations.

Galloway, C., 2 standard blackboards.

Girls' Industrial Club, 115 made dresses for Christmas, 43 pairs boys' trousers.

Higginson, Mr., 4 barrels apples.

Huyler, Mr., 30 pounds candy for Christmas.

Kribs, Mrs. H. G., 500 fancy boxes for candy.

Low, Miss, large box of Christmas tree ornaments.

Ledyard, Mr. and Mrs. L. C., Christmas tree and gifts for 100 children.

Nicholson, Mrs. J., 2 large packing boxes of clothing and shoes and 2 infants' blankets.

Stokes, Mrs. A. P., 250 potted plants, 264 dressed dolls for Christmas, 240 toys for Christmas.

Sands, Mrs. P. J., 1 box cut flowers, 10 pounds sugar and 10 pounds tea for mothers' meetings, 1 bonnet, 1 skirt, 2 pairs slippers, 1 pair rubbers, 28 boys' flannel shirts, 12 infants' garments, 1 box shells.

Sands, Miss E., 4 silk shirt waists.

Saturday Evening Dancing Class, 90 pairs mittens, 75 pairs stockings.

Southwick, Mrs., package of clothing.

Tuesday Morning Sewing Class, 205 garments.

Unknown friend, 1 coat, 3 flannel shirts, 1 skirt, 1 shirt waist and stockings.

Unknown friend, 5 knitted scarfs.

Williamson, Mrs., package of clothing.

Wirtz, A., 2 bundles clothing.

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SIXTY-EIGHTH ANNUAL REPORT

OF THE

MANAGERS

OF

The New York Institution for the Blind.

For the Year Ending September 30, 1903.

LUX ORITUR:

"And I will bring the blind by a way they know not; I will lead them in paths they have not known; I will make darkness light before them."—Isaiah xiii, 16.

TRANSMITTED TO THE LEGISLATURE, JANUARY 13, 1904.

ALBANY
OLIVER A. QUAYLE
State Legislative Printer
1904

MANAGERS OF THE NEW YORK INSTITUTION FOR THE BLIND, IN CHRONOLOGICAL ORDER, FROM THE TIME OF ITS INCORPORATION, 1831, WITH THEIR TERMS OF SERVICE.

Ackerly, Samuel, M. D	1831–1845
Averill, Herman	1831–1832
Bolton, Curtis	1831–1835
Donaldson, James	1831–1832
Bogert, Henry K.	1831–1832
Remsen, Henry	1831–1832
Stuyvesant, John R.	1831–1840
Price, Thompson	1831–1840
Ketchum, Morris	1831–1837
Miller, Sylvanus	1831–1832
Crosby, William B.	1831–1833
Lee, Gideon	1831–1836
Ketchum, Hiram	1831–1838
Wood, Samuel	1831–1836
Jenkins, Thomas W.	1831–1836
Thomas, Henry	1831–1834
Nevins, Rufus L.	1831–1832
Beers, Joseph D.	1831–1832
Mott, Samuel F.	1831
Patterson, Matthew C.	1831–1833
Russ, John D., M. D	1833–1834
Dwight, Theodore	1833–1837
Brown, Silas	1833–1859
Hagg, John P.	1833
Spring, George	1833–1835
Walker, John W.	1833–1839
Miller, Franklin	1833–1835
Steel, Jonathan D.	1833
Allen, Moses	1834
Lyon, Stephen	1834–1836

Dissosway, Gabriel P	1834–1836
Phelps, Anson G,	1834–1855
Crosby, William H.	1835
Hoyt, Charles	1835–1839
Oakley, Charles	1835
Titus, Peter S	1836
Allen, George F.	1836–1839, 1841–1862
Trulock, Joseph	1836–1840
Mandeville, William	1836–1837
Chandler, Adoniram	1836
Cushman, D. Alonzo	1837–1843
Blakeman, Wm. N., M. D	1837–1839, 1841
Wood, Isaac, M. D	1837–1859
Hart, Joseph C	1837–1840
Holmes, Curtis	1837–1838
Roome, Edward	1837–1845
Seton, Samuel W	1837
Gracie, Robert	1838–1861
Demilt, Samuel	1838
Hart, James H	1839
Murray, Robert J.	1839–1858
Schermerhorn, Peter Augustus	1839–1845
Tallmadge, Henry F	1839–1841
Thompson, Martin E.	1839
Moore, Clement C	1840–1850
Olyphant, D. W. C	1840
Averill, Augustine	1840
Beers, Cyrenius	1841–1853
Suydam, Lambert	1841–1842
Holmes, Silas	1841–1842
Case, Robert L	1841–1861
Crosby, John P	1841–1859
Collins, Stacey B	1841
Schermerhorn, E. H	1841–1842
Marsh, James	1842–1852
Murray, Hamilton	1842–1847

Walsh, A. R	1842–1850
Wood, John	1842–1850
Jones, Edward	1843–1850
Whittemore, William T	1843–1845
Smith, Floyd	1844–1848
Dean, Nicholas	1844–1848
Jones, William P	1846–1849
Thurston, William R	1846–1851
Sheldon, Henry	1846–1854
King, John A	1848–1854
Schell, Augustus	1849–1883
Day, Mahlon	1849–1854
Jones, George F	1850–1859, 1865
Adams, John G	1851–1858
Ogden, Gouverneur M	1851–1857
Cobb, James N	1851–1858
Beadle, Edward L	1851–1862
Wood, Edward	1852–1861
Ogden, John D., M. D	1853–1855
Craven, Alfred W	1854–1861
Olyphant, G. T	1855–1857
Abbatt, William M	1855–1857
Noyes, William Curtis	1855–1859
Dumont, William	1856–1862
Warren, James	1856–1859
Cammann, George P., M. D	1858
Rutherford, Lewis M	1858–1861
Van Rensselaer, Henry	1858–1860
Hone, Robert S	1859–1891
Tomes, Francis	1859–1860
Norton, Charles B	1859–1861
Church, William H., M. D	1859–1864
Hutchins, Waldo	1860–1867
Tuckerman, Charles K	1860–1867
Kennedy, James Lenox	1860–1864
Travers, William R	1860

Tompkins, Daniel H.	1860–1874
Aspinwall, J. Lloyd	1860–1861
Suydam, D. Lydig	1861–1884
Daly, Charles P.	1861
Hosack, Nathaniel P.	1862–1876
Grafton, Joseph	1862–1872
Myers, T. Bailey	1862–1887
Edgar, Newbold	1862–1864, 1868
Donnelly, Edward C.	1862–1864
Lord, James Cooper	1862–1864
Schermerhorn, Alfred	1862–1865, 1867–1868
Irving, John Treat	1863–1896
Brown, John Crosby	1862–1864
Van Rensselaer, Alex	1862–1865, 1867–1877
Potter, Clarkson N.	1863–1866
McLean, James M.	1863–1890
Clift, Smith	1865–1893
Hoffman, Charles B.	1865–1868
Emmett, Thos. Addis, M. D.	1865–1866
Whitewright, William	1866–1898
Schermerhorn, William C.	1866–1901
De Rahm, Charles	1866–1890
Hilton, Henry	1866
Burrill, John E.	1866–1867
Stout, Francis A.	1867–1892
Butterfield, Daniel	1868
Hoffman, William B.	1868–1879
Gerard, James W.	1869–1873
Schermerhorn, F. Augs.	1870–1903
Marié, Peter	1870–1903
Rhoades, J. Harsen	1870–1873
Rhinelander, Frederick W.	1874–1903
Sheldon, Frederick	1874–1903
Robbins, Chandler	1875–1903
Strong, Charles E.	1875–1887
Schuyler, Philip	1878–1898

Prime, Temple	1878–1887
Kane, John I	1881–1903
King, Edward	1884–1893
Schell, Edward	1885–1893
Bronson, Frederick	1888–1900
Kingsland, Ambrose C	1889–1890
Robbins, George A	1889–1895
Kissel, Gustav E	1891–1903
Bowers, John M	1891–1903
Peabody, George L., M. D	1891–1903
Marshall, Charles H	1892–1903
Smith, Gouverneur M., M. D	1893–1898
Davis, Howland	1894–1903
Duer, William A	1894–1903
Hamilton, William G	1894–1903
Appleton, William W	1896–1903
Tappen, Frederick D	1897–1901
Armstrong, D. Maitland	1898–1903
Wheelock, George G., M. D	1898–1903
Fairchild, Charles S	1898–1903
Soley, James Russell	1900–1903
Winthrop, Egerton L., Jr	1901–1903
Wickersham, George W	1902–1903
Foster, Frederick De Peyster	1903

MANAGERS OF THE NEW YORK INSTITUTION FOR THE BLIND, IN ALPHABETICAL ORDER, FROM THE TIME OF ITS INCORPORATION, 1831, WITH THEIR TERMS OF SERVICE.

Abbatt, William M	1855–1857
Ackerly, Samuel, M. D	1831–1845
Adams, John G., M. D	1851–1858
Allen, George F	1836–1839, 1841–1862
Allen, Moses	1834
Appleton, William W	1896–1903
Armstrong, D. Maitland	1898–1903

Aspinwall, J. Lloyd	1860–1861
Averill, Augustine	1840
Averill, Herman	1831–1832
Beadle, Edward L.	1851–1862
Beers, Cyrenius	1841–1853
Beers, Joseph D.	1831–1832
Blakeman, Wm. N., M. D.	1837–1839, 1841
Bogert, Henry K.	1831–1832
Bolton, Curtis	1831–1835
Bowers, John M.	1891–1903
Bronson, Frederick	1888–1900
Brown, John Crosby	1862–1864
Brown, Silas	1833–1859
Burrill, John E.	1866–1867
Butterfield, Daniel	1868
Cammann, George P., M. D.	1858
Case, Robert L.	1841–1861
Chandler, Adoniram	1836
Church, William H., M. D.	1859–1864
Clift, Smith	1865–1893
Cobb, James N.	1851–1858
Collins, Stacey B.	1841
Craven, Alfred W.	1854–1861
Crosby, John P.	1841–1859
Crosby, William B.	1831–1833
Crosby, William H.	1835
Cushman, D. Alonzo	1837–1843
Daly, Charles P.	1861
Davis, Howland	1894–1903
Day, Mahlon	1849–1854
Dean, Nicholas	1844–1848
Demilt, Samuel	1838
De Rahm, Charles	1866–1890
Dissosway, Gabriel P.	1834–1836
Donaldson, James	1831–1832
Donnelly, Edward C.	1862–1864

Duer, William A.	1894–1903
Dumont, William	1856–1862
Dwight, Theodore	1833–1837
Edgar, Newbold	1862–1864, 1868
Emmett, Thos. Addis, M. D	1865–1866
Fairchild, Charles S	1898–1903
Foster, Frederick De Peyster	1903
Gracie, Robert	1838–1861
Grafton, Joseph	1862–1872
Gerard, James W	1869–1873
Hagg, John P	1833
Hamilton, William G	1894–1903
Hart, James H	1839
Hart, Joseph C	1837–1840
Hilton, Henry	1866
Hoffman, Charles B	1865–1868
Hoffman, William B	1868–1879
Holmes, Curtis	1837–1838
Holmes, Silas	1841–1842
Hone, Robert S	1859–1891
Hosack, Nathaniel P	1862–1876
Hoyt, Charles	1835–1839
Hutchins, Waldo	1860–1867
Irving, John Treat	1863–1896
Jenkins, Thomas W	1831–1836
Jones, Edward	1843–1850
Jones, George F	1850–1859, 1865
Jones, William P	1846–1849
Kane, John I	1881–1903
Kennedy, James Lenox	1860–1864
Ketchum, Hiram	1831–1838
Ketchum, Morris	1831–1837
King, Edward	1884–1893
King, John A	1848–1854
Kingsland, Ambrose C	1889–1890
Kissel, Gustav E	1891–1903

Lee, Gideon	1831–1836
Lord, James Cooper	1862–1864
Lyons, Stephen	1834–1836
Mandeville, William	1836–1837
Marie, Peter	1870–1903
Marsh, James	1842–1852
Marshall, Charles H	1892–1903
McLean, James M	1863–1890
Miller, Franklin	1833–1835
Miller, Sylvanus	1831–1832
Moore, Clement C	1840–1850
Mott, Samuel F	1831
Murray, Hamilton	1842–1847
Murray, Robert J	1839–1858
Myers, T. Bailey	1862–1887
Nevins, Rufus L	1831–1832
Norton, Charles B	1859–1861
Noyes, William Curtis	1855–1859
Oakley, Charles	1835
Ogden, Gouverneur M	1851–1857
Ogden, John D., M. D	1853–1855
Olyphant, D. W. C	1840
Olyphant, G. T	1855–1857
Patterson, Matthew C	1831–1833
Peabody, George L., M. D	1891–1903
Phelps, Anson G	1834–1855
Potter, Clarkson N	1863–1866
Price, Thompson	1831–1840
Prime, Temple	1878–1887
Remsen, Henry	1831–1832
Rhinelander, Frederick W	1874–1903
Rhoades, J. Harsen	1869–1872
Robbins, Chandler	1875–1903
Robbins, George A	1889–1895
Roome, Edward	1837–1845
Russ, John D., M. D	1833–1834

Rutherford, Lewis M	1858–1861
Schell, Augustus	1849–1883
Schell, Edward	1885–1893
Schermerhorn, Alfred	1862–1865, 1867–1868
Schermerhorn, E. H	1841–1842
Schermerhorn, F. Augs	1870–1903
Schermerhorn, Peter Augs	1839–1845
Schermerhorn, William C	1866–1901
Schuyler, Philip	1878–1898
Seton, Samuel W	1837
Sheldon, Frederick	1874–1903
Sheldon, Henry	1846–1854
Smith, Floyd	1844–1848
Smith, Gouverneur M., M. D	1893–1898
Soley, James Russell	1900–1903
Spring, George	1833–1835
Steel, Jonathan D	1833
Stout, Francis A	1867–1892
Strong, Charles E	1875–1887
Stuyvesant, John R	1831–1840
Suydam, D. Lydig	1861–1884
Suydam, Lambert	1841–1842
Tallmadge, Henry F	1839–1841
Tappen, Frederick D	1897–1901
Thomas, Henry	1831–1834
Thompson, Martin E	1839
Thurston, William R	1846–1851
Titus, Peter S	1836
Tomes, Francis	1859–1860
Tompkins, Daniel H	1860–1874
Travers, William R	1860
Trulock, Joseph	1836–1840
Tuckerman, Charles K	1860–1867
Van Rensselaer, Alex	1862–1865, 1867–1877
Van Rensselaer, Henry	1858–1860
Walker, John W	1833–1839

Walsh, A. R.	1842–1850
Warren, James	1856–1859
Wheelock, George G., M. D.	1898–1903
Whitewright, William	1866–1898
Whittemore, William T.	1843–1845
Wickersham, George W.	1902–1903
Winthrop, Egerton L., Jr.	1901–1903
Wood, Edward	1852–1861
Wood, Isaac, M. D.	1837–1859
Wood, John	1842–1850
Wood, Samuel	1831–1836

OFFICERS OF THE INSTITUTION FROM ITS INCORPORATION IN 1831, WITH THEIR TERMS OF SERVICE.

Presidents.

Ackerly, Samuel, M. D.	1831–1842
Phelps, Anson G.	1843–1853
Wood, Isaac, M. D.	1854–1859
Allen, George F.	1860–1862
Schell, Augustus	1863–1883
Hone, Robert S.	1884–1887
McLean, James M.	1888–1890
Irving, John Treat	1891–1895
Schermerhorn, Wm. C.	1896–1901
Schermerhorn, F. Augs.	1901–1903

Vice-Presidents.

Averill, Herman	1831–1832
Brown, Silas	1833–1835
Titus, Peter S.	1836
Phelps, Anson G.	1837–1842
Wood, Isaac, M. D.	1843–1853
Gracie, Robert	1855–1860
Beadle, Edward L.	1861–1862
Hone, Robert S.	1863–1883
Suydam, D. Lydig	1884

McLean, James M.	1885–1887
Clift, Smith	1888–1893
Schermerhorn, Wm. C.	1894–1895
Marié, Peter	1896–1903
Rhinelander, F. W.	1903

Treasurers.

Bolton, Curtis	1831–1835
Brown, Silas	1836–1859
Wood, Edward	1860–1861
Schell, Augustus	1862
Kennedy, James Lenox	1863–1864
Clift, Smith	1865
Grafton, Joseph	1866–1871
Whitewright, William	1872–1896
Davis, Howland	1897–1903

Recording Secretaries.

Bogert, Henry K.	1831–1832
Russ, John D., M. D.	1833–1834
Crosby, William H.	1835
Allen, George F.	1836–1839, 1841–1859
Hone, Robert S.	1860–1862
Brown, John Crosby	1863
Myers, T. Bailey	1864–1883
Schermerhorn, F. Augs.	1884–1901
Marshall, Charles H.	1901–1903

Corresponding Secretaries.

Donaldson, James	1831–1832
Dwight, Theodore	1833–1837
Wood, Isaac, M. D.	1839–1842
Roome, Edward	1843–1844
Schermerhorn, Peter Augs.	1845
Jones, Edward	1846–1850
Wood, Isaac, M. D.	1851–1853
Crosby, John P.	1854–1859
Church, William H., M. D.	1860
Tuckerman, Charles K.	1861–1867

Schermerhorn, Wm. C.	1868–1893
Bronson, Frederick	1894–1895
Sheldon, Frederick	1896–1903

SUPERINTENDENTS OF THE INSTITUTION FROM ITS INCORPORATION IN 1831, WITH THEIR TERMS OF SERVICE.

Russ, John D., M. D	1832–1834
Office unfilled	1835 and part of 1836
Jones, Silas	1836–1840
Vroom, Peter D., M. D	1841–1842
Boggs, William	1843–1845
Chamberlain, James F	1846–1852
Cooper, T. Golden	1853–1860
Rankin, Robert G	1861–1863
Wait, William B	1863–1903

BOARD OF MANAGERS, 1903.

	Terms of continuous service.
Frederick Augustus Schermerhorn, since	1870
Peter Marié,* since	1870
Frederick W. Rhinelander, since	1874
Frederick Sheldon, since	1874
Chandler Robbins, since	1875
John I. Kane, since	1881
Gustav E. Kissel, since	1891
John M. Bowers, since	1891
George L. Peabody, M. D., since	1891
Charles H. Marshall, since	1892
Howland Davis, since	1894
William A. Duer, since	1894
William G. Hamilton, since	1894
William W. Appleton, since	1896

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* Deceased January 13, 1903.

	Terms of continuous service.
D. Maitland Armstrong, since	1898
George G. Wheelock, M. D., since	1898
Charles S. Fairchild, since	1899
James Russell Soley, since	1901
Edgerton L. Winthrop, Jr., since	1901
George W. Wickersham, since	1902
Frederick De Peyster Foster, since	1902

OFFICERS OF THE BOARD.

F. AUGUSTUS SCHERMERHORN	President
PETER MARIÉ	Vice-Presidents
FREDERICK W. RHINELANDER	
CHARLES H. MARSHALL	Recording Secretary
FREDERICK SHELDON	Corresponding Secretary
HOWLAND DAVIS	Treasurer

STANDING COMMITTEES.

Committee on Finance.

CHARLES S. FAIRCHILD, JOHN M. BOWERS,
GEORGE W. WICKERSHAM.

Committee on Supplies, Repairs and Improvements.

FREDERICK SHELDON, CHARLES H. MARSHALL,
JOHN I. KANE, WILLIAM A. DUER,
GEORGE G. WHEELOCK, M. D.

Committee on Education.

CHANDLER ROBBINS, GEORGE L. PEABODY, M. D.,
WILLIAM W. APPLETON, GUSTAV E. KISSEL.

Committee on Manual Training.

JAMES RUSSELL SOLEY, D. MAITLAND ARMSTRONG,
EGERTON L. WINTHROP, JR., FRED'K De PEYSTER FOSTER.

FACULTY.

WILLIAM B. WAIT	Principal

Literary Department.

STEPHEN BABCOCK,
EVERETT B. TEWKESBURY,
MARY B. SCHOONMAKER,
GEORGIA T. SCHOONMAKER,
CHARLOTTE W. HOWE,
CLARA BOOMHOUR,
NAOMI BOOMHOUR,
MARGARET A. MACANN,
IRENE SCOFIELD,
JEAN Y. AYER.

Music Department.

HANNAH A. BABCOCK,
JULIA S. LOOMIS,
EVA E. KERR,
JESSIE COMFORT,
MARY WEATHERLOW.

Tuning.

HENRY COFFRE.

Kindergarten.

NAOMI BOOMHOUR.

Manual Training and Home Science.

FRANCES A. WARD,
RUDOLPH MUSSEHL,
MARY B. SCHOONMAKER,
DANIEL McCLINTOCK,
JENNIE AGNEW.

ADMINISTRATIVE DEPARTMENT.

DWIGHT L. HUBBARD, M. D	Attending Physician
WILLIAM H. HARRISON*	Steward
ANNA L. PHIPPS	Matron
L. ADELLE ROGERS	Matron
ZOE KNAPP	Librarian and Stenographer
MARGARET P. FROST	Accountant
ALICE HATCHMAN	Assistant
HANNAH M. RODNEY	Assistant
ANNA M. SHERIDAN	Assistant

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*Until January 1, 1903.

STATE OF NEW YORK

No. 13

IN ASSEMBLY,

JANUARY 13, 1904.

SIXTY-EIGHTH ANNUAL REPORT

OF

The New York Institution for the Blind.

To the Honorable the Legislature of the State of New York:

The managers of the New York Institution for the Blind, in compliance with the provisions of the act of the Legislature, respectfully submit their report for the year ending September 30, 1903.

The whole number of pupils during the last year was 179.

The report of the principal, which gives much interesting information relating to the work of the school, is annexed.

The following is a statement of the moneys received and expended:

Current Account.

Balance September 30, 1902	$3,584 19
Current receipts	75,419 78
	$79,003 97
Current expenditures	$72,575 29
Cash balance September 30, 1903	6,428 68
	$79,003 97

Investment Fund Account.

Balance September 30, 1902	$86,844 43
Receipts:	
Legacies	$24,193 76
Interest and rents	13,389 34
	$124,427 53
Payments:	
Taxes	$8,447 23
Transferred to current account	14,000 00
Balance September 30, 1903	101,980 30
	$124,427 53

Building Fund Account.

Balance September 30, 1902	$20,089 17
Interest	466 79
	$20,555 96

Expenditures in building operations	$19,700 29
Balance September 30, 1903	855 67
	$20,555 96

Library Fund.

Balance September 30, 1902	$2,754 44
Interest and cash received	108 90
	$2,863 34

The treasurer's statement, which is annexed, gives a detailed account of the current receipts and expenditures.

The managers gratefully acknowledge the receipt during the year of twenty-four thousand one hundred ninety-three dollars and seventy-six cents from the estate of Mary J. Walker, which sum has been added to the Investment Fund Account.

The following is a list of the legacies and donations which have been received by the institution since its organization in 1831 to September 30, 1903:

Miles R. Burke	$2,000 00
Jane Van Cortland	300 00
Isaac Bullard	101 66
Elizabeth Bayley	100 00
John Jacob Astor	5,000 00
William Beam	500 00
Peter G. Stuyvesant	3,000 00
John Horsburgh	5,000 00
Elizabeth Demilt	5,000 00
Sarah Demilt	2,000 00
C. D. Betts	40 00
Sarah Penny	500 00

Sarah Bunce	$500 00
Elizabeth Idley	196 00
Samuel S. Howland	1,000 00
William Howe	2,985 14
Margaret Fritz	100 00
James McBride	500 00
Charles E. Cornell	521 96
Charles E. Deming	50 00
Mrs. Dewitt Clinton	200 00
W. Brown	465 00
Elizabeth Gelston	1,000 00
Robert J. Murray	500 00
Seth Grosvenor	10,000 00
Elijah Withington	100 00
Benjamin F. Butler	812 49
Frissel Fund	2,000 00
Simeon V. Sickles	6,561 87
Anson G. Phelps	5,675 68
Thomas Reilly	2,254 84
Elizabeth Van Tuyle	100 00
John Penfold	470 00
Madame Jumel	5,000 00
Mrs. Steers	34 66
Thomas Garner	1,410 00
Chauncey and Henry Rose	5,000 00
Elizabeth Magee	534 00
John J. Phelps	2,350 00
Rebecca Elting	100 00
Regina Hornstein	250 00
Gerard Martins	500 00

John Alstyne	$10,320	44
Mrs. Adeline E. Schermerhorn	10,000	00
Henry H. Munsell	3,396	32
Thomas C. Chardevoyne	5,000	00
William Dennistoun	11,892	77
William B. Astor	5,000	00
Benjamin F. Wheelwright	1,000	00
George T. Hewlett, Executor	500	00
Ephraim Holbrook	39,458	16
Mrs. Emma B. Corning	5,000	00
Eliza Mott	1,475	54
Henry E. Robinson	6,000	00
Caroline Goff	4,161	59
Simeon Abrahams	5,052	70
Catherine P. Johnston	530	00
Maria M. Hobby	2,509	82
Daniel Marley	1,749	30
Thomas Eggleston	2,000	00
Sarah A. Riley	100	00
William E. Saunders	725	84
Thomas Eddy	1,027	50
Robert C. Goodhue	1,000	00
Jonathan C. Bartlett	190	00
Stephen V. Albro	428	57
George Dockstader	325	00
Roosevelt & Sons	45	00
Samuel Willetts	5,045	00
Augustus Schell	5,000	00
James Kelly	5,000	00
William B. and Leonora S. Bolles	2,949	11

Edward B. Underhill	$500 00
Cash (sundry donations)	133 18
Harriet Flint	1,776 74
Harriet Gross	1,000 00
Mary Hopeton Drake	2,340 00
Mary Rogers	1,000 00
Polly Dean	500 00
John Delaplaine	302 99
Abby A. Coates Winsor	1,000 00
Maria C. Robbins	10,000 00
William Clymer	2,000 00
J. L., of Liverpool, England	25 00
Emma Strecker	12,221 66
Elizabeth and Sarah Wooley	5,984 83
Benjamin Nathan	1,000 00
Thomas M. Taylor	6,151 94
James Peter Van Horn	20,000 00
Caleb Swan	500 00
Maria Moffett	14,112 21
Maria Moffett, other stocks	2,800 00
Mary E. Brandish	89 40
Thomas W. Strong	1,893 00
John Vanderbilt	25 00
Julia L. Peyton	1,000 00
Eli Robbins	5,000 00
Margaret Burr	11,011 11
Mary Burr	10,611 11
Julia Ann Delaplaine	38,842 25
Amos R. Eno	5,000 00
Clarissa L. Crane	1,000 00

Leopold Boscowitz	$1,000 00
Emeline S. Nichols	5,000 00
Margaret Salsbury	100 00
Sarah B. Munsell	477 56
Edward L. Beadle	4,303 99
Mrs. E. Douglas Smith	40 00
Henry Schade	20 00
George Merrill	40 00
William C. Schermerhorn	10,000 00
Cecilia J. Loux	2,000 00
Mary J. Walker	24,193 76

Of the funds thus received, there were invested in New York city stock nineteen thousand dollars ($19,000) at par value, and in bonds secured by mortgage on real estate in this city one hundred and fifty-six thousand dollars ($156,000). A portion of these funds, amounting to one hundred one thousand nine hundred eighty dollars and thirty cents ($101,980.30), is deposited at interest in the Union Trust Company.

The remainder of the fund has been applied in such ways as the managers have thought would best promote the educational work for which the institution was founded and secure the financial position and the physical conditions which are essential to the success and stability of the institution.

During the past year some progress has been made in preparations for putting up new buildings for the occupation and use of the institution on the site long since secured at One Hundred and Sixty-fifth to One Hundred and Sixty-eighth streets. The work in progress comprises excavation and grading on the building site, opening a road on the line of what will be One Hundred and

Sixty-eighth street, between Broadway and Fort Washington avenue, and in filling the lowland lying west of the building site, which is overflowed by water from the Hudson river.

The outlay for the last named item has been made necessary by an order of the board of health, requiring that all standing water be excluded from the premises lying between One Hundred and Sixty-fifth and One Hundred and Sixty-eighth streets.

The development of plans has been very considerably delayed by a project to widen Boulevard La Fayette, which bounds our building site on the west, and to construct a "commercial road" and a bridle path from One Hundred and Fifty-seventh street to One Hundred and Eightieth street. The plan required that forty feet be taken from the entire western front of our building site, which by reason of its rugged topography is already too small.

While the managers are heartily in favor of public improvements that are really necessary and that will improve and beautify this part of the city, still they feel that this project will inflict a serious damage upon the institution, partly in the loss of ground necessary to its educational purposes and partly in the heavy assessments which it must pay, and for which the improvement will confer no compensating advantage.

Owing to the prevailing high price of provisions, $280 per pupil has proved insufficient to meet the current expenses of the institution, and the managers therefore respectfully ask of your honorable body that the per capita compensation for the education of State pupils be raised from two hundred and eighty dollars ($280) to three hundred dollars ($300) for the ensuing year.

All of which is respectfully submitted.

THE NEW YORK INSTITUTION FOR THE BLIND.

F. AUGUSTUS SCHERMERHORN, *President.*

CHARLES H. MARSHALL, *Recording Secretary.*

City and County of New York, ss.:

F. Augustus Schermerhorn, of said city, being duly sworn, saith: That he is president of the New York Institution for the Blind and that the above report signed by him is true to the best of his knowledge and belief.

F. AUGUSTUS SCHERMERHORN.

Sworn to before me this 23d day of December, 1903.

Hulbert Peck,
Notary Public, New York County.

Report of the Treasurer.

Howland Davis, Treasurer, in account with The New York Institution for the Blind, for the year ending September 30, 1903.

CURRENT FUND.

Dr.

Balance, September 30, 1902		$3,584 19
Received from—		
State of New York	$38,759 89	
State of New Jersey	5,896 77	
New York city	660 00	
Music and instruction	790 08	
Clothing, drygoods, etc	104 75	
Supplies	293 18	
Petty account	1 65	
Furniture and fixtures	3 50	
New York county	2,566 98	
Kings county	1,396 30	
Queens county	216 71	
Suffolk county	50 00	
Nassau county	2 19	
Putnam county	2 19	
Richmond county	91 64	
Investment fund	22,447 23	
Interest	150 47	
Manual training	1,691 25	
Rent	295 00	
		75,419 78
		$79,003 97

Cr.

By cash paid for—

Supplies	$15,215 70	
Salaries and wages	31,884 85	
Clothing, drygoods, etc	3,302 87	
Furniture and fixtures	1,844 07	
Principal's fund	500 00	
Repairs and improvements	1,088 68	
Traveling	58 42	
Electricity	84 46	
Gas	1,646 20	
Music and instruction	3,101 36	
Manual training	649 12	
Taxes	8,447 23	
Legal expense	48 60	
Petty account	1,253 23	
Drugs and medicines	67 60	
Fuel	3,282 90	
Insurance	100 00	
		$72,575 29
Cash balance September 30, 1903		6,428 68
		$79,003 97

HOWLAND DAVIS,

Treasurer.

November 23, 1903.

The foregoing statement of Howland Davis, Treasurer, has been examined by us and found to be correct.

GEORGE W. WICKERSHAM,

CHARLES S. FAIRCHILD,

Finance Committee.

Report of the Principal.

To the Board of Managers:

Gentlemen—I beg to submit the following report for the year ending September 30, 1903:

Number of pupils September 30, 1902	161
Admitted during the year	18
Whole number instructed	179
Reductions	27
Number remaining	152

In every institution, whether commercial, industrial, or educational, that persists long enough to develop proper methods and acquire experience, facilities and organization, it becomes necessary to ascertain the character and quality of the work done, by a comparison with similar products and results according to recognized tests and standards. The value of that which comes without direct personal cost is hard to appreciate, and hence such tests are urgently needed in all free education, in which the tendency to undervalue and waste opportunities is natural and strong.

The application of such tests at regular intervals eliminates bad methods and superfluous subject-matter, arouses the ambition and sustains the interest of teachers and students, and prevents indifference, idleness, and absence.

In 1890 we began proving our school work through examinations by the University of the State of New York, of which this institution is a member, and since that time have continued the practice as an established part of the school work.

The examinations take place in January, March and June of each year, and the benefits derived are manifest in the increased and sustained efficiency of the teaching, in greater industry and a real love for literature and learning on the part of the pupils, and by the higher reputation and rank which this institution has attained.

In my report of 1899 there were given some tables compiled from the reports of the Regents, showing the results of the examinations in the schools of the State generally, as compared with the results obtained in this school.

The facts disclosed by the inquiry were not only gratifying, but possessed considerable value, for they not only furnished a definite knowledge of the real status of our work, as compared with that of ordinary schools, but showed the comparative excellence of our work in spelling, thus dissipating an illusion entertained by teachers generally that blind children are and must necessarily be the worst of poor spellers.

Since the publication referred to, examinations have been held through five more years, the State figures for three of which are now at hand, and the inquiry is taken up again with a view to still further establish the relative quality of our work during this latter periord.

In the following table the results are given in percentages, as found by careful tabulation and comparison of the statistics published in the yearly reports of the Regents of the University of the State of New York.

The table presents the examination facts in three phases, viz:

1. The number of papers claimed by the schools as being up to standard out of the whole number written.
2. The number of papers allowed by the Regents examination department out of the whole number examined.
3. The number of papers allowed out of the whole number claimed.

The figures under 1898 are for seven years ending June 30, 1898, under 1901 for three years ending June 30, 1901, and under 1903 for the five years ending June 30, 1903.

TABLE 1.

SUBJECTS.	Per Cent Claimed of Number Examined.				Per Cent Allowed of Number Examined.				Per Cent Allowed of Number Claimed.			
	STATE.		INSTITUTION.		STATE.		INSTITUTION.		STATE.		INSTITUTION.	
	1898 for 7 years.	1901 for 3 years.	1898 for 7 years.	1903 for 5 years.	1898 for 7 years.	1901 for 3 years.	1898 for 7 years.	1903 for 5 years.	1898 for 7 years.	1901 for 3 years.	1898 for 7 years.	1903 for 5 years.
Reading	96	97	95	80	96	97	95	80	100	100	100	100
Writing	90	94	97	100	90	94	97	100	100	100	100	100
Spelling	61	70	72	82	59	68	71	82	96	98	99	99
Elementary English	57	65	54	74	51	53	54	68	89	82	100	93
Geography	58	61	74	66	53	56	74	66	91	91	100	100
Arithmetic	55	60	69	68	52	59	69	68	96	98	100	100
Advanced arithmetic	46	54	52	29	34	45	52	29	70	83	100	100
Advanced English	51	65	34	56	38	48	33	56	73	74	97	100
English composition	74	79	92	87	60	62	92	87	81	79	100	100
Rhetoric	70	80	93	74	58	60	84	74	82	75	92	100
American literature	84	....	86	....	74	....	86	....	82	....	100	....
Physics	58	70	64	25	40	59	64	25	67	84	100	100
Physiology and hygiene	61	67	64	61	53	60	64	61	86	90	100	100
United States history	63	67	74	87	53	57	74	87	85	85	100	100
New York State history	72	....	39	....	58	....	35	....	81	....	89	....
Roman history	85	83	100	63	72	71	100	63	85	85	100	100
English history	73	77	83	77	58	64	83	77	80	84	100	100
Physical geography	72	71	87	76	63	64	87	76	88	90	100	100
Geology	79	87	70	100	68	78	69	100	83	90	100	100
Algebra	72	....	100	....	70	....	100	....	98	....	100	....
English literature	....	92	....	71	....	83	....	71	....	90	....	100
Civics	....	72	....	56	....	62	....	56	....	87	....	100
General history	....	85	....	83	....	76	....	83	....	89	....	100
Geometry	....	66	....	83	....	59	....	83	....	90	....	100
Advanced United States history	....	71	....	73	....	53	....	67	....	75	....	93
Psychology	....	89	....	82	....	76	....	82	....	86	....	100
American selections	....	88	....	60	....	76	....	60	....	86	....	100
Advanced English composition	....	78	....	89	....	38	....	89	....	49	....	100
English selections	....	89	....	100	....	78	....	100	....	88	....	100
Home science	....	68	....	100	....	3	....	100	....	5	....	100
Average	69	76	75	74	60	63	74	74	86	83	99	99

It may here be pointed out that the first subdivision of Table 1, "Number claimed of number examined," is the resultant of four operative factors, namely, teachers' class work, pupils' class work, pupils' examination work, and teachers' judgment as to the merits of the examination work.

The second subdivision, "Number allowed of number examined," expresses the operation of four factors, namely, teachers' class work, pupils' class work, pupils' examination work, and Regents examiners' judgment of the work.

The third subdivision, "Number allowed of number claimed," represents two principal factors, namely, teachers' care, knowledge and judgment in rating examination papers, and the care, knowledge and judgment of the Regents examiners in rating the same papers.

While the work of the pupils and various matters over which teachers have no control will largely affect the results shown under the first two subdivisions, the teachers are wholly responsible for the ratings they give to answer papers.

Though ambition or anxiety for the success of pupils may sometimes induce overrating, a paper which is rated too high, whether for either of these reasons or because of carelessness, misapprehension, incapacity, or want of judgment, will be rejected, and the blame will unavoidably rest upon the teachers responsible for the error.

Furthermore, and what is of much more importance, a tendency to overvalue examination work may be significant of the same tendency in regular class work, which will inevitably lead to excessive claims, a large percentage of failures, and a low average of results. This is a point, therefore, upon which every teacher should be solicitous and careful to avoid any mistakes.

The averages in the bottom line of Table 1 present some interesting features.

Of the whole number examined in the given subjects for the seven years the State schools claim 69 per cent, while for the past three years the claim rose to 76 per cent, a gain of 7 points, or 10.1 per cent. For the institution the similar claims for seven years were 75 per cent, and for the past five years 74 per cent, a loss of one point, or 1.3 per cent.

Under the head of claims allowed to whole number examined, the State schools rose from 60 per cent to 63 per cent, a gain of 5 per cent. Under this heading the average of the institution for the two periods of seven and five years was the same, namely 74 per cent.

Under the head of papers allowed to papers claimed the State schools fell from 86 per cent to 83 per cent, a loss of 3 points, or 3.4 per cent, while the institution for the two periods of seven years and five years remained at 99 per cent.

If the results for the last three years for the State and for the last five years for this school be compared with the results for the seven-year period, the gains or losses in each subject, if any, will appear.

For example, take the subject of spelling for the several periods:

For the seven-year period, of those examined the State schools claimed 61 per cent; for the three-year period, 70 per cent. This is a gain of 9 points, or 14.7 per cent.

For seven years, this school claimed 72 per cent; and for the last five years, 82 per cent. This is a gain of 10 points, or 13.8 per cent.

For the same period, the papers allowed of papers examined were, for the State, seven years, 59 per cent; for the State, three years, 68 per cent; gain, 9 points, or 15.2 per cent.

For this school, the papers allowed were, for seven years, 71 per cent; for the last five years, 82 per cent; gain, 11 points, or 15.4 per cent.

The papers allowed to those claimed were, State schools, for seven years, 96 per cent; for three years, 98 per cent; gain, 2 points, or 2 per cent.

In my first comparisons of results given in the report for Septemer 30, 1899, attention was particularly called to the subject of spelling, a branch in which, by general consent, blind students were held to be necessarily and hopelessly inferior to those who can see. Blindness so completely prevents the common methods of practice in spelling and so limits the range and use of literature that the assumption seems to be not only plausible, but reasonable.

A comparison of the results obtained in this school and in the State schools threw a new light upon this subject, dispelled the old disparaging belief, and actually reversed the position.

In 1899 the comparison covered seven years of work, and the inquiry is now continued over three more years for the State and five more for the institution.

The following table gives the results in percentages:

SUBJECT.	PER CENT CLAIMED OF NUMBER EXAMINED.				PER CENT ALLOWED OF NUMBER EXAMINED.				PER CENT ALLOWED OF NUMBER CLAIMED.			
	INSTITUTION.		STATE.		INSTITUTION.		STATE.		INSTITUTION.		STATE.	
	1898 for 7 years.	1903 for 5 years.	1898 for 7 years.	1901 for 3 years.	1898 for 7 years.	1903 for 5 years.	1898 for 7 years.	1901 for 3 years.	1898 for 7 years.	1903 for 5 years.	1898 for 7 years.	1901 for 3 years.
Spelling	72	82	61	70	71	82	59	68	99	99	96	98

Comparing the three and five year periods each with the seven-year period, the following changes appear:

In papers claimed of number examined, the institution gained 13.8 per cent; the State gained 14.7 per cent.

In papers allowed of number examined, the institution gained 15.4 per cent; the State gained 15.2 per cent.

In papers allowed of number claimed, the institution secured for each period 99 per cent; the State gained 2 per cent.

During the seven years ending June 30, 1898, the institution exceeded the State 18 per cent in papers claimed of number examined; 20.3 per cent in papers allowed of number examined; 3.1 per cent in papers allowed of number claimed.

During the three years for the State ending June 30, 1901, and five years for the institution ending June 30, 1903, the institution exceeded the State 17.1 per cent in papers claimed of number examined; 20.5 per cent in papers allowed of number examined; 1 per cent in papers allowed of number claimed.

For the whole period of ten years for the State and twelve years for the institution, the institution exceeded the State 20.3 per cent in papers claimed of number examined; 22.5 per cent in papers allowed of number examined; 2 per cent in papers allowed of number claimed.

For the first period of seven years it appears that of the whole number examined in spelling, the institution passed 71 per cent and the State 59 per cent, a difference in favor of the institution of 12 per cent.

For the last period of three years for the State and five for the institution, the institution passed 82 per cent and the State 68 per cent, a difference in favor of the institution of 14 per cent.

In the last three years the State has gained 15.2 per cent in papers passed and the institution 15.4 per cent.

If the excess of advantage were shared equally between the State schools and the institution, it could easily be accounted for as resulting from those variable conditions which exist to a greater or less extent in all schools, and which cause results in one year to differ from those of another. But when for a period of years the advantage is on one side, and that too the weaker one, it seems that the cause must lie largely in the different theories adopted as the basis of practice in this branch of language work.

In the previous discussion of this question (Report September 30, 1899), it was shown, first, that the sense of hearing and the speaking voice, together with the phonic memory and the vocal memory, constitute the primary physiological and psychological basis of language, and therefore of spelling; second, that as written letters and words are only the signs for the real objects, visual methods and memories, of which visual writing is one, should only be used as supplemental to, and not as a substitute for, aural methods and memories. The experience of the past five years confirms the opinion that this view is pedagogically correct.

The low efficiency of schools generally in spelling has created a wide interest and resulted in some valuable contributions on this subject.

Among the new textual books for the current year is one by George E. Johnson, of the University School, Cleveland, Ohio. Referring to the *phonic* difficulties of our language, Mr. Johnson says: "More than 95 per cent of the errors in spelling monosyllables are in the vowels."

The reference is of course to the spelling of pupils having sight, and who every day and hour see the vowels correctly used in spelling books, text books, and all reading matter. The memory is that of lineal form, but if the words be written, the form will usually differ from the printed form, thus giving rise to another series of form memories, which hinders rather than helps the learner. The motor memory of writing is probably dependent upon and inseparable from the form memory.

The right use of vowels must depend upon memories of some kind. In this case it appears that, notwithstanding all these visual resources in constant use, 95 per cent of all errors in monosyllabic spelling occur with less than one-third of the letters of the alphabet.

I am indebted to Mr. Johnson for some interesting data contributed by Herman Schiller, a German investigator, who has made extensive tests with German children to prove the value of methods in spelling. From his experiments Mr. Schiller determined the value of several different practice methods, under the two general heads of visual and aural, to be as follows, from highest to lowest:

1. Copying with speaking (naming the letters softly).
2. Copying with speaking aloud.
3. Seeing with writing movement.
4. Spelling (hearing the letters named).
5. Seeing with speaking aloud.
6. Seeing with speaking softly.
7. Seeing alone.
8. Hearing with writing movement.
9. Hearing with speaking aloud.
10. Hearing with speaking softly.
11. Hearing alone (word pronounced only).

In all these methods, except hearing the letters named, and hearing the word pronounced but not spelled, the work is done by the pupil alone.

Spelling based on words pronounced but not spelled to the pupils takes lowest place, but spelling based on words both pronounced and spelled to the ear takes fourth place. Here it should be noted that there is a long period in a child's life before it has learned to read or write, when hearing and speech are the only available means of learning language.

It will be seen that Schiller gives first place to a composite method—copying and speaking softly—the complete act involving four memories, namely, a visual form memory, a manual motor memory, a vocal motor memory, and the aural memory, which last necessarily accompanies an articulated sound, for if there be no hearing there can be no speech.

The scheme outlined by Mr. Schiller doubtless embraces all the expedients employed with pupils who can see; but, as will be seen, differs widely from the practice in this school, which is outlined as follows:

1. Speaking word by teacher.
2. Hearing word by pupil.
3. Speaking letters and syllables by teacher.
4. Hearing letters and syllables by pupil.
5. Speaking word by pupil. } Hearing himself.
6. Speaking letters by pupil. }
7. Hearing word spoken and spelled by teacher, writing in embossed form with reading by touch, with and without loud speaking in class order.
8. Hearing word spoken without spelling, with writing on typewriter.

Comparing the two schemes, it may be said that in respect to hearing, speaking and writing, they are substantially similar, although in practice the blind are always at disadvantage. Our scheme, however, does not embrace any of the visual resources which form a very important part of the scheme for pupils who can see; and yet, as before seen, the visual basis, as typified in Mr. Schiller's practice school, has yielded 64 per cent in results, while the aural basis has given 77 per cent.

In the matter of writing and reading there is of course a wide dissimilarity in appliances and in their operation, but no one will for a moment contend that the sense of touch is at all commensurate with the sense of sight. The difference in results seems to be dependent on the difference in value assigned to visual and aural methods.

In schools for the seeing, visual methods are given first place throughout the course, and the sense of sight is intensively and systematically trained in color, form, drawing, nature study, manual training, games, and in many other ways, while hearing is quite neglected. Indeed, the hearing and aural methods receive about as much consideration in schools for the seeing as sight and visual methods do in schools for the blind.

Hearing is not wholly ignored, but it is used only in casual ways, and is never systematically trained on pedagogical lines, even in the study of music.

In schools for the blind visual methods are impracticable, and hearing necessarily takes first place, and is the chief foundation and reliance in the study of language and all other subjects.

In connection with the subject of examinations, it should be pointed out that a large part of the time and energy of this school is devoted to a thorough and extended course of music study, technical and theoretical, in which the attainments of the pupils are very meritorious. Owing, however, to the peculiar and anomalous organization of the University of the State of New York, music subjects are not recognized in the preliminary, secondary, or high school courses, and hence our pupils can receive no credentials and the institution no recognition for the extensive and excellent work done in the music department.

The educational interests of the State would be promoted and the University broadened and strengthened if the branches of music study were added to the University list of subjects, and credentials offered for successful work, the same as is done in other subjects.

Obviously, if the time we devote to music could have been given to literary studies, our examination results would have been greatly increased.

The educational resources of technical and theoretical music are indispensible to the education of the blind. The difficulties are many and great, but our facilities are excellent, our methods good, and the results gratifying.

In June last fifteen examinations of the American College of Musicians were successfully passed by pupils of the music department in Organ Demonstrative, Acoustics, Form, and Esthetics.

The use of raffia in the manual training classes has justified the hopes raised concerning it something more than two years ago, when it was introduced.

The material easily brings the mind and the hand into agreeable relation, and offers the widest scope for ever increasing skill, facility, ingenuity, originality and taste.

In the manual training course usually prescribed for children who see, the first step is taken with raffia, which is followed by cord-work. At first we observed this order, but experience has shown that in our classes the lessons in cord-work should precede those of raffia, as the former is firmer and more easily manipulated by beginners than the latter.

One of the interesting and very enjoyable features of the term which opened in September was a series of lectures by Miss Hannah A. Babcock, for many years identified with the music department, and who in company with Mrs. Wait spent several weeks during the past summer in travel abroad. The route followed a short itinerary through the Netherlands, the Rhine district, Switzerland, Italy, France, England and Scotland. In a course of thirteen lectures each occupying forty-five minutes, Miss Babcock gave a graphic account of her observations and impressions of places and people, enriched by copious references to geography, scenery, history, biography, architecture, literature, music and art.

These lectures, given to the faculty and school, were a noteworthy contribution to the educational work of the year, and will long be remembered with pleasure by those who heard them.

The recent purchase of thirty-seven new typewriting machines has greatly improved our facilities for class work in all branches.

The wide range of text books now available in New York Point, which is being steadily enlarged by the addition of important works, a complete outfit of writing appliances, comprising point tablets, kleidographs and typewriting machines, has greatly stimulated the mental activities of the pupils and increased the desire for real disciplinary work and for self-culture.

The year has been one of hard work, and while nothing else could have been expected, still it affords me much pleasure to express my appreciation of the cordial cooperation of my coworkers and to commend the pupils for their interest, industry and good deportment.

Respectfully submitted.

WM. B. WAIT,
Principal.

Daily Program.

A. M.

8 to 8.10.

Chapel exercises.

8.10 to 9.00.

Geometry,
Arithmetic,
Advanced English,
Geography,
Reading,
Kindergarten,

Piano,
Point music notation,
Counterpoint,
Organ,
Piano tuning,
Manual training.

9.00 to 9.50.

Arithmetic,
Physiology and hygiene,
Kleidograph,
Nature study,
Geography,
Spelling,
Point writing,

Harmonic notation,
Harmony,
Organ,
Piano,
Piano tuning,
Manual training,
Kindergarten.

9.50 to 10.00.

Recess.

10.00 to 10.50.

Arithmetic,
Elementary U. S. history,
Advanced U. S. history,
Geography,
Kindergarten,

Organ,
Piano,
Piano tuning,
Manual training.

10.50 to 11.40.

Arithmetic,
Physics,
Elementary English,
Language lessons,
Kindergarten,
Piano,
Organ,
Manual training,
Piano tuning,
Geography.

11.40 to 11.55.

Recess.

11.55 to 12.45.

Arithmetic,
Geography,
Calisthenics,
Kindergarten,
Algebra,
Piano,
Organ,
Piano tuning,
Harmonic notation,
Harmony,
Manual training.

P. M.

1.45 to 2.30.

Senior singing class,
Junior singing class,
Typewriting,
Piano,
Piano tuning,
Manual training.

2.30 to 3.15.

Reading,
Spelling,
Typewriting,
Elementary English,
Home science,
Piano,
Organ,
Music history,
Piano tuning,
Manual training.

3.15 to 3.30.

Recess.

3.30 to 4.15.

Latin, first year,
Reading,
Spelling,
Typewriting,
Home science,
Piano,
Piano tuning,
Organ,
Manual training,
Kindergarten.

4.15 to 5.00.

Spelling,
Typewriting,
Home science,
Kindergarten,
Organ,
Piano,
Manual training,
Piano tuning.

Except from 6 to 6.30 the time from 5 to 8.30 is divided into half hours, and occupied in reading, general study, and the practice of music.

Regents Requirements.

[From the Syllabus of the University of the State of New York.]

PRELIMINARY AND ACADEMIC EXAMINATIONS.

Below is a complete table, grouped according to cognate relations of all subjects in which regular examinations are held to meet the varying needs, dependent on locality, constituencies and special courses, of the secondary schools of the State. The appearance of so many subjects on this list should not be made an excuse for overcrowding the curriculum. Principals should not form classes in advanced subjects with immature pupils, nor should they confuse with the secondary school course subjects in which examinations are held or instruction is given for advanced or special students or for those pursuing extension courses.

PRELIMINARY STUDIES.

Reading,
Writing,
Spelling,
Elementary English,
Arithmetic,
Geography.

ACADEMIC STUDIES.

The table assumes that each student takes three studies each day for five days each week. The term " count " represents ten weeks' work in one of these studies. The figure prefixed to each subject shows how many counts are allowed that subject.

Those who pass successfully in both parts of any of the following four parallel courses will receive half credit for the second part:

1 Second-year Latin or Caesar.
2 Third-year Latin or Virgil's Aeneid.
3 Second-year Greek or Anabasis.
4 Third-year Greek or Homer's Iliad and twenty weeks of equal grade.

Those who pass successfully in the following courses will receive full credit:

1 Second-year English and American selections.
2 Third-year English and English selections.
3 English reading and history of literature.

GROUP 1.

LANGUAGE AND LITERATURE—ENGLISH (*a*)

4 English, first year, or
    2 Advanced English and
    2 English composition.
4 English, second year, or
    2 Rhetoric and
    2 American selections.
4 English, third year, or
    2 Advanced English composition and
    2 English selections.
4 English reading, or
    4 History of literature.
2 Business English (*d*).

MODERN FOREIGN.

4 German, first year.
4 German, second year.

4 German, third year.

4 French, first year.

4 French, second year.

4 French, third year.

4 Spanish, first year.

4 Spanish, second year.

4 Spanish, third year.

ANCIENT.

4 Latin, first year (*b*).

4 Latin, second year (*c*).

4 Caesar's Commentaries.

4 Latin, third year (*c*)

2 Sallust's Catiline.

3 Cicero's Orations.

4 Virgil's Aeneid.

1 Virgil's Eclogues.

1 Latin composition.

4 Greek, first year (*b*).

4 Greek, second year (*c*).

4 Xenophon's Anabasis.

2 Homer's Iliad.

4 Greek, third year (*c*).

1 Greek composition.

GROUP 2.

MATHEMATICS.

2 Advanced arithmetic.

4 Algebra.

2 Advanced algebra.

4 Plane geometry.

2 Solid geometry.

2 Trigonometry.

2 Business arithmetic (*d*).

GROUP 3.

SCIENCE.

PHYSICAL.

2 Astronomy,

4 Physics,

4 Chemistry.

GEOLOGIC.

2 Physical geography,

2 Geology.

BIOLOGIC.

2 Botany,

2 Zoology,

2 Physiology and hygiene.

GROUP 4.

HISTORY AND SOCIAL SCIENCE.

2 Elementary United States history and civics,

2 Greek history,

2 Roman history,

2 Medieval history,

2 English history,

2 Advanced United States history,

2 Civics,

2 Economics,

2 Commercial geography (*d*),

2 Commercial law (*d*),

1 History of commerce (*d*).

GROUP 5.

OTHER STUDIES.

2 Stenography, 50 words per minute,

2 Stenography, 100 words per minute,

2 First-year home science (*e*),

2 Second-year home science (*e*),

2 First-year shopwork (*e*),

2 Second-year shopwork (*e*),

2 Bookkeeping,

2 Advanced bookkeeping (*d*),

2 Business practice, etc. (*d*),

1 Business writing (*d*),

2 Typewriting (*d*).

FORM-STUDY AND DRAWING.

2 Drawing,

2 Advanced drawing.

SUMMARY.

Subjects.	Branches.	Counts.
English	12	34
German	3	12
French	3	12
Spanish	3	12
Latin	9	26
Greek	6	19
Mathematics	7	18
Science	8	20
History, etc	11	21
Other studies	12	25
Total	74	199

(*a*) No extra counts will be given to those who pass both in English, first year, and advanced English and English composition; English, second year, and rhetoric; English, third year, and advanced English composition.

(*b*) In first-year Latin and Greek candidates may take the separate examination or defer it and receive eight counts each for passing Cæsar and Anabasis examinations, which include the work of the first year. The separate examination is provided for those who may not study Latin or Greek after the first year, and for those who prefer to secure the four credits for first year's work and to take a separate examination in Cæsar or Anabasis rather than have eight counts dependent on a single trial.

(*c*) Latin, second year, is offered as a substitute for Cæsar, and Greek, second year, as a substitute for Anabasis; Latin, third year, and Greek, third year, are essentially sight translations.

(*d*) The special subjects for State business credentials may be credited toward academic credentials: advanced bookkeeping, commercial law, business English, business arithmetic, business practice and office methods, commercial geography and history of commerce, typewriting and business writing.

(*e*) For the present no formal written examinations will be given in home science and shopwork, but two counts will be allowed for the successful completion of each year's work on the certificate of the principal and the approval of the Regents inspector.

NOTES.

Order of studies—There is no restriction in the order in which studies may be taken.

Time limit—There is no limit of time, but all credentials issued by the University are good till canceled for cause.

Seventy-five per cent of correct answers is required in all subjects.

Answer papers will be reviewed in the Regents office, and all papers below standard will be returned to the candidates. For those accepted, pass cards will be issued.

Candidates not attending schools in which Regents examinations are held should send notice at least ten days in advance, stating at what time and in what studies they wish to be examined, that required desk room may be provided at the most convenient place.

Candidates who fail to send this advance notice can be admitted only so far as there are unoccupied seats.

Professional certificates without examinations—Candidates having credentials which can be accepted in place of examinations should send them to the high school department.

Sample papers—The academic papers and the professional papers for each year are bound in separate volumes, either of which is mailed in paper covers for 75 cents, or board for 50 cents. Unbound sample papers may be had for 1 cent each.

UNIVERSITY CREDENTIALS.

1. Pass card—Any study.

2. Preliminary (preacademic) certificate—Reading, writing, spelling, elementary English, arithmetic, geography.

3. Academic certificates—All preliminaries and the subjects specified for the first-year certificate; all preliminaries and any 24, 36, 48, 60, etc., counts, if one-sixth of these counts are in English.*

The number of counts that each subject represents is given in the table of groups. For 24 counts a two-year certificate will be issued, and for 36, 48, etc., counts a three, four, etc., year certificate will be issued. A new certificate will be given when 12 additional counts, which represent a full year's work, are earned.

First-year certificate—No certificate is issued for 12 counts unless it includes the preliminaries and first-year English* (or English composition and two other English counts).

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*Any foreign language may be substituted for English, but the papers of all students who claim this privilege will be revised carefully for English.

Academic diploma—All preliminaries and any 48 counts, if not less than 8 are in English,* and not less than 6 each from the second, third, and fourth groups.

Classical academic diploma—This credential will be issued on request to such students as meet the requirements for an academic diploma and have credit for the required classical studies. The required classical studies are as follows: First-year Latin, Cæsar or second-year Latin, Cicero, Virgil, Latin composition, first-year Greek, Xenophon or second-year Greek, Iliad, Greek composition, Greek history, Roman history.

Advanced diploma — This single diploma provides for all academic courses longer than the regular 48-count course covered by the academic diploma above. It is issued only to those who have earned the regular 48-count diploma and 12, 24, or 36, etc., counts in addition. On its face are specified the total counts, its name being determined by the highest multiple of 12.

Honors—When three-fourths of all the counts for any academic certificate or diploma are won by at least 90 per cent or more, the credential will be recorded and marked as having been earned "with honor," and the annual report will show how many honor credentials have been issued to each school, with names of recipients.

Indorsements—Holders of diplomas may have studies passed later recorded on the back, or, by special request, on the face; but such indorsements will not be made on certificates.

Duplicate credentials—These will be issued to replace lost or soiled originals on receipt of 25 cents each for the extra labor of looking up and verifying records.

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*Any foreign language may be substituted for English, but the papers of all students who claim this privilege will be revised carefully for English.

INSTRUCTIONS TO CANDIDATES.

To be read aloud to all candidates by the principal or the deputy in charge at the beginning of each session.

1. No candidate shall communicate in any way or bring to the examination books or helps of any kind or question any examiner.

2. At the close of the examination in each subject each candidate must affix to his answer paper, in the line following the last answer, the following declaration, subscribe his name and then deliver his answer paper to the examiner:

"I now, at the close of the examination in (name subject), declare that prior to this examination I had no knowledge of what questions were to be proposed, and have neither given nor received explanations or other aid in answering any of them."

Every set of answers lacking this declaration, however satisfactory in other respects, will be rejected.*

3. Any candidate detected in trying to give or obtain aid will be instantly dismissed from the room and his papers for the entire week will be canceled.

4. Any candidate who, with fraudulent intent, endeavors to obtain any credential of the University shall be debarred from entering any Regents examination till admitted by special permission from the University on written application to the secretary. The University reserves the right to revoke any of its credentials obtained by disregard or violation of any of its rules. Ignorance of these rules will not be accepted as an excuse.

5. No candidate shall enter the examination more than half an hour late, and no candidate shall leave the room within half an hour after the distribution of question papers.

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*Schools preferring may have printed copies of the prescribed declaration conspicuously posted in the examination rooms, requiring students to subscribe to it by writing merely the formula, "I do so declare," followed by their signatures.

6. Heed strictly all directions on the question papers and read the questions very carefully. Do not give information that is not asked for. Write in ink on both sides of the paper. Give special attention to general order, legibility and neatness. Use only paper distributed by the examiners.

7. Write answers in the order of the questions. Do not copy the questions, but write the number of each question in the left margin before the answer. Leave a line blank after the answer to each question.

8. Papers should not be folded. At the top of each sheet or half sheet should be written on two separate lines, 1, subject; 2, date; 3, place; 4, name, e. g.:

Arithmetic. Albany High School.
June 15, 1903. James Burns.

Outline of Music Studies.

[From the Syllabus of the American College of Musicians.]

NOTATION.

The staff; meter; F, G, and C clefs; signature of time and key; dynamics; tempo; form. The study should be objective throughout, the essential nature and relation of things being first considered and then the signs therefor. The study should be accompanied from the first with daily exercises in writing, in rendering by voice or instrument, and in interpreting or reading by ear. This will give facility in the use of notation, accuracy in performance, and will render the contents of the staff intelligible to the ear. The cultivation of discriminating aural perception is much neglected, and yet the contents of a musical expression should be as intelligible to the ear when rendered into sound as are the contents of a picture to the eye.

GENERAL MUSIC HISTORY.

First year—Origin and nature of primitive music, vocal and instrumental; music among the Hebrews and other ancient nations; development by the Greeks; origin of the organ.

2. Music from the beginning of the Christian era through the first ten centuries; influence of the church; the Ambrosian and Gregorian modes; notation; origin of polyphony.

3. Music from about 1000 A. D. to 1400 A. D.; development of notation and polyphony; church and secular music; counterpoint;

influence of the Crusades; the Troubadours and Minnesingers; the Folk Song; the organ.

4. Music, 1400 to about 1600; the advance of counterpoint; the Netherlandic epoch; progress and influence of secular and church music; culmination of counterpoint; rise of opera and oratorio; progress of instrumental music; improvement of the organ.

5. Music, 1600 to 1700, in Germany, Italy, France, England and other countries; development of the opera and oratorio; introduction of the harpsichord and clavichord; the progress of instrumental music; the violin group; wood and brass instruments and the organ; the orchestra.

6. Music, 1700 to the present; Italian, French and German opera; oratorio, cantata, and passion music; instrumental music; the song; development of musical forms; the pianoforte; development of the modern tonal style; derivation of standard pitch.

MUSIC HISTORY.

Second year—In connection with the general outlines, the development of music in the following special lines should be studied: Ancient and modern tonality; standards of pitch; origin and improvement of instruments; art forms; systems of tuning; national characteristics; Italian, French and German opera; church and organ music; biography.

HARMONY.

First year—A thorough working knowledge of the formation, names and classification of intervals, scales, keys, chords; figured bass; structure of forbidden progressions. The student should be prepared to recognize these elements at sight and by ear, and to form them with facility upon keyboard and staff.

Rules of part-writing; concords and their inversions in all keys; auxiliary and passing notes; cadences; the phrase and period; modulations by means of triads only; dictated and original exercises to be written and played; reading by ear.

Second year—Discords and their inversions; modulation; dictated and original exercises, with figured bass, to be written and played; harmonizing melodies; reading by ear.

Third year.—Altered and ambiguous chords; dictated and original exercises in figured bass; modulation; harmonizing melodies with modulations; reading by ear; exercises to be written and played.

Fourth year—Organ point; suspension; anticipation; passing notes; melodic embellishments; harmonic embellishments; harmonizing melodies and unfigured basses; figuration; reading by ear; exercises to be written and played.

Fifth year—Advanced.

COUNTERPOINT.

First year—Two parts; one, two, three, four, six, and eight notes against one; syncopation; florid counterpoint; dictated and original exercises, to be written and played daily throughout the course; reading by ear.

Second year—Three parts; all classes, as in first year. Four parts; all classes, as in first year.

Third year—Counterpoint in five or more parts; imitation; canon. In addition to the study of examples, the student must prepare original exercises throughout the course. Fugue: the subject; real and tonal answers; countersubject; episode; reply; modulation; stretto; pedal point; analysis and classification of examples; original work; reading by ear.

Fourth year—Double, triple and quadruple, with advanced study of subjects, as in third year.

TERMINOLOGY.

In the various departments of music a large number of terms of special significance and derived from many sources are employed, and with which the student of music should be acquainted. The study is designed to bring out the technical and exact meaning of such terms, together with their derivation, orthography and correct pronunciation. The study should include a critical examination of terms used in melody, rhythm, dynamics, meter, harmony, counterpoint, and, in short, in every branch of music. The following are examples: Define key, scale, mutation stop, triad, adagio, stretto, exposition, the inverted turn, etc.

MUSIC FORM.

First year—Meter; rhythm; section; phrase; period; small and large primary forms; licenses of construction; development of motives; composite primary form; theme and variations, étude, dance forms, march, idealized dance forms, special forms, reading and analysis throughout the course, with original work.

Second year—The Rondo; first, second, third and mutational forms; vocal forms; first and third parts of sonatina form in major and minor; omissions; second part of the sonatina form.

Third year—The Sonata; principal subject; secondary subject; closing group; coda; connecting link; third part; modulations; modifications; developments; theoretic work; finale; higher rondo forms; the fourth and fifth forms; the slow movement; the composite large sonata; other applications of the instrumental forms; canon and fugue; reading and analysis throughout the course, with original work.

ESTHETICS.

The relation and functions of talent, emotion, intelligence and technic to expression; mechanical devices and processes; accents, their uses and classifications; nature of meter and rhythm; grammatical accent; esthetic value of regular, displaced and syncopic accent; phrasing; characteristic accents; national and individual; melodic accents; thematic accent by transformations; quantitative accent; harmonic accent; utility of dissonances; the slur; auxiliary, neighboring and passing notes; suspension, anticipation and organ point. Dynamics as applied to melody; melody with and without accompaniment; simple and elaborate accompaniment; relative importance of interwoven melodies; dynamic effect of fundamental basses; dynamics in accompaniment; the crescendo and diminuendo; sudden dynamic changes; tempo; accelerando and ritardando; sudden changes of tempo; touch and tone color; use of the pedals; value of unity and diversity.

The study should be accompanied by ample illustrations, with examination of many examples and reading by ear. Special effort should be made to cultivate the critical in connection with the executive faculties.

ACOUSTICS.

This study should embrace the phenomena and laws relating to the production and properties of sound waves and tones, transmission, pitch, quality, velocity, reflection, refraction, vibration of strings and pipes, resonance and interference, beats and beat tones, musical intervals, temperament.

ORCHESTRATION.

Instruments played with a bow; instruments played with the hand; stringed instruments with keys; reed instruments; wind instruments without reeds; wind instruments with keyboards;

brass instruments with mouthpieces; wood instruments with mouthpieces; instruments of percussion; miscellaneous instruments.

ORGAN, VOICE AND VIOLIN.

The technical course in each of these branches will be published separately.

List of Publications in the New York Point Print.

These publications are obtained at the American Printing House for the Blind, Louisville, Ky.:

MUSIC CULTURE.

Chopin and Other Musical Essays, H. T. Fink	$3 00
Composition, Dr. J. Stainer	2 25
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Cohen, Isador
Crandall, Charles F.
Dean, John J.
Di Blasio, Angelo
Diez, Julio
Dore, Alfred
Doyle, James
Etwaneg, Moses
Fleckenstein, Henry
Fogel, Bernhardt
Freudenreich, Rudolph
Frickenhaus, Carl
Fuhrmeister, William T.
Furmann, Louis J.
Garlichs, Herman
Glasmann, Ashley
Grantzow, Andrew
Gold, Louis
Hagerman, Axel
Hanchette, Boyd K.
Hawxhurst, George
Hayes, James
Helwig, Raymond J.
Holmes, J. Immanuel
Johnson, Thomas
Johnson, Thomas
Kearney, Edgar
Kelly, Francis
Kelly, Harry E.
Kemp, John
Kessler, William E.
Kirby, Joseph
Klein, Harry

Knight, J. W. Harvey
Kostowski, Walter
Krakower, Jacob
Krey, Henry
Kunz, Charles William
Lindner, William
Mack, Edward J.
Marchman, Edward
McConvell, Charles
McCormack, John
McIntyer, Patrick
McPartland, Walter
Meinert, Charles A.
Monohan, Charles
Moore, William
Murphy, Joseph
Nabenhauer, Albert A.
Neder, George
Nelson, Ralph
Newton, John G. N.
Nolan, William
Novack, Joseph
O'Mala, James J.
Pirnie, Alexander
Phillips, Harry
Pursell, Marcus
Reichhard, Joseph
Richardson, C. Edwin
Richardt, John
Robinson, Joseph
Rosenman, Samuel
Russo, George
Schwartz, Cyrus
Shearon, John
Stone, George
Tagland, George
Thompson, Albert T. F.
Tim, Irving
Tobi, Moses P.
Tobin, William
Trolla, Antonio
Tuckhorn, Walter
Williams, Harry
Winsmore, John
Winter, George
Wright, Robert

FEMALES.

Albrecht, Lillie F.
Arnowitz, Annie
Barthold, Elsie
Barton, Antoinette
Bordo, Julia
Britton, Doretta
Busse, Josephine
Butler, E. Loretta
Cartanzo, Catherine
Clark, Catherine

Clegg, Catherine
Cohen, Catherine
Costello, Nellie
Coyle, Catherine
Crampton, Clara
Cronin, Mary
Decker, Mabelle
Dingley, Harriet
Dyer, Theresa
Evans, M. Ellen
Ewersmann, Leonora C.
Fein, Sadie
Flynn, Elizabeth
Geercke, Henrietta
Gordon, Gertrude
Groves, Florence M.
Haddock, Loretta
Hardy, Edith
Harold, May
Heckel, Barbara
Heil, Emily T.
Hogan, Margaret R.
Holden, Margaret D.
Horan, Elizabeth
Huppert, Minnie
Infeld, Sadie
James, Ethel G.
Johnson, Ida
Johnson, Martha
Klein, Lena
Knapp, Sarah E.
Kurz, Louisa
Leonard, Mary M.
Maher, Annie
Maier, Annie
Masker, Lily I.
Mattson, Thyra
Mayer, Augusta
McBride, Abby
Monohan, Annie
Moran, Mary
Myers, Catherine
O'Shaughnessy, Catherine
Payne, Elizabeth
Phalen, Elizabeth
Pike, M. Belle
Pimple, Annie
Probst, Margaret
Schoellner, Mary
Schipp, Carrie
Schwartz, Esther
Scott, Violet
Seitzt, Francesca
Steinburg, Sarah
Vandermace, Katie May
Vanderbilt, Amber
Von Bebern, Catherine
Vogt, Lena D.

Vopat, Rose
Wagerman, Elizabeth
Warren, Margaret
Weiss, C. Gladys
Whittaker, Sarah
Williams, Jane
Williams, Lucy
Wintringham, Ruth
Wollert, Anna
Woods, Theresa

ANNUAL REPORT

OF THE

SUPERINTENDENT

OF THE

Onondaga Salt Springs.

TRANSMITTED TO THE LEGISLATURE JANUARY 14, 1904.

ALBANY
OLIVER A. QUAYLE
STATE LEGISLATIVE PRINTER
1904

STATE OF NEW YORK

No. 14.

IN ASSEMBLY,

JANUARY 14, 1904.

ANNUAL REPORT

OF THE

SUPERINTENDENT OF THE ONONDAGA SALT SPRINGS.

SUPERINTENDENT'S OFFICE,
SYRACUSE, N. Y., *January* 1, 1904.

To the Hon. SAMUEL FREDERICK NIXON, *Speaker of the Assembly:*

Dear Sir—I have the honor herewith to transmit to the Legislature my annual report as superintendent of the Onondaga Salt Springs for the year 1903, exhibiting the inspection of salt, the condition of the works and the various other matters pertaining to the operation of the State works.

HOYT H. FREEMAN,
Superintendent Onondaga Salt Springs.

REPORT.

INSPECTION OF SALT.

The whole amount of salt inspected on the Onondaga Salt Springs Reservation in and near the city of Syracuse during the year 1903 is 1,933,224$\frac{18}{56}$ bushels of 56 pounds each.

Of this quantity, 95,800$\frac{53}{56}$ bushels have been produced in the fine salt works by artificial heat and 1,837,423$\frac{21}{56}$ bushels in the coarse salt works by solar evaporation.

The inspection in the several districts into which the reservation has been partitioned has been as follows:

Syracuse—District No. 1.

	Bushels.
Fine salt	95,800$\frac{53}{56}$
Solar salt	262,440$\frac{28}{56}$
Total	358,241$\frac{25}{56}$

Liverpool—District No. 2.

Solar salt	808,832$\frac{19}{56}$

Geddes—District No. 3.

Solar salt	766,150$\frac{30}{56}$

The moneys collected by the Superintendent during the year were as follows:

Rent of office	$60 00
Duties on 1,933,224$\frac{18}{56}$ bushels of salt	19,332 22
Total	$19,392 22

Agreeably to chapter 27, section 12, of the Laws of 1898, I call your attention to the following items of receipts:

The revenue derived from the duty of salt	$19,332 22
Cash on hand January 1, 1903	4,423 91
Cash derived from rent of office	60 00
Total	$23,816 13

Which has been deposited in the State Bank of Syracuse to the credit of the superintendent, said bank having been designated by the Comptroller as the place of deposit for moneys from the above source.

Disbursements have been as follows:

For salaries	$6,765 74
For repairing structures, machinery, labor and material	13,954 21
Total	$20,719 95

Cash on hand January 1, 1904	$3,096 18
Total expenditures	20,719 95
	$23,816 13

The following statement shows the expenditures by districts:

Syracuse—First District.

Salaries	$3,140 74
Coal	4,552 10
Engineers	1,755 60
Labor and teaming	3,895 15
Hardware and oil	499 63
Machinery and repairs	810 16
Lumber	102 30
Miscellaneous	746 39
Total	$15,502 07

Salina—Second District.

Salaries	$1,085 00
Labor and teaming	666 00
Miscellaneous	3 50
Total	$1,754 50

Liverpool—Third District.

Salaries	$1,100 00
Miscellaneous	2 40
Total	$1,102 40

Geddes—Fourth District.

Salaries	$1,440 00
Labor and teaming	915 98
Miscellaneous	5 00
Total	$2,360 98

RECAPITULATION.

Total amount of receipts	$23,816 13
Total amount of expenditures	20,719 95
Receipts over expenditures	$3,096 18

Salt inspected at the Onondaga Salt Springs:

	Bushels.
Syracuse district	358,241 $\frac{25}{56}$
Liverpool district	808,832 $\frac{19}{56}$
Geddes district	766,150 $\frac{30}{56}$
	1,933,224 $\frac{18}{56}$

MANUFACTURE OF SALT.

The past season has not been profitable to those manufacturing salt.

The salt inspected and marketed during the year has been a trifle more than the preceding year, but prices have ruled low.

EXPENSES.

The price paid for coal during past year was 50 cents per ton more than it was the preceding year, which made our expenses for that commodity $1,479.23 more than in year 1902, while the salaries paid were $3,056.35 less than in year 1902. With the money and the revenue to be derived from the duty of salt there is no doubt in my mind but that I will be able to meet all expenses that may accrue during this year.

CONDITION OF PUBLIC WORKS.

The structures, machinery and other property under my charge on the reservation are in fair condition with the exception of the waterwheel and pump at the Geddes pumphouse, which will have to be replaced with new ones in the near future.

I estimate the improvement suggested would cost the sum of $1,000.

Respectfully yours,

HOYT H. FREEMAN,

Superintendent Onondaga Salt Springs.

Yearly Recapitulation—District No. 1

	Coarse salt.		Fine salt.		Duties.	
	Bushels.	Pounds.	Bushels.	Pounds.	Dollars.	Cents.
For 5 weeks January	16,193	15	1,820	18	$180	14
For 4 weeks February	14,438	54	1,174	12	156	14
For 4 weeks March	24,641	36	6,623	40	312	66
For 5 weeks April	19,921	48	7,490	36	274	12
For 4 weeks May	13,734	16	6,691	14	204	26
For 4 weeks June	22,887	52	10,426	3	333	13
For 5 weeks July	19,761	4	10,106	29	298	68
For 4 weeks August	27,244	2	10,725	2	379	68
For 5 weeks September	32,572	19	11,655	4	442	27
For 4 weeks October	12,630	8	10,398	49	230	30
For 4 weeks November	38,522	44	7,723	28	462	25
For 5 weeks December	19,892	10	10,965	42	308	58
For 52 weeks ending January 1, 1904	358,241 $\frac{1}{56}$				$3,582	41

Yearly Recapitulation—District No. 2.

	Coarse salt.		Fine salt.		Duties.	
	Bushels.	Pounds.	Bushels	Pounds.	Dollars.	Cents.
For 5 weeks January	57,297	18	......	..	$572	97
For 4 weeks February	32,944	36	......	..	329	46
For 4 weeks March	39,350	40	......	..	393	51
For 5 weeks April	37,701	44	......	..	377	02
For 4 weeks May	139,435	38	......	..	1,394	36
For 4 weeks June	102,422	..	......	..	1,024	22
For 5 weeks July	101,501	24	......	..	1,015	01
For 4 weeks August	79,314	16	......	..	793	14
For 5 weeks September	76,209	24	......	..	762	09
For 4 weeks October	36,024	04	......	..	360	24
For 4 weeks November	45,266	39	......	..	452	66
For 5 weeks December	61,364	16	......	..	613	64
For 52 weeks ending January 1, 1904	808,832	19	......	..	$8,088	32

Yearly Recapitulation—District No. 3.

	Coarse salt.		Fine salt.		Duties.	
	Bushels.	Pounds.	Bushels.	Pounds.	Dollars.	Cents.
For 5 weeks January	40,996	48	......	..	$409	96
For 4 weeks February	7,235	40	......	..	72	35
For 4 weeks March	5,103	40	......	..	51	03
For 5 weeks April	16,446	24	......	..	164	46
For 4 weeks May	36,397	20	......	..	363	98
For 4 weeks June	69,372	32	......	..	693	73
For 5 weeks July	128,780	16	......	..	1,287	80
For 4 weeks August	97,762	32	......	..	977	63
For 5 weeks September	124,458	24	......	..	1,244	59
For 4 weeks October	107,217	32	......	..	1,072	17
For 4 weeks November	115,343	2	......	..	1,153	43
For 5 weeks December	17,036	..	......	..	170	36
For 52 weeks ending January 1, 1904	766,150	30	......	..	$7,661	49

THE FOLLOWING IS A STATEMENT OF THE NUMBER OF BUSHELS OF SALT MADE AT THE ONONDAGA SALT SPRINGS SINCE JUNE 20, 1797, WHICH IS THE DATE OF THE FIRST LEASES IN LOTS.

DATE.	Solar.	Fine.	Aggregate bushels.	Superintendent.
1797	....	25,474	25,474	William Stevens.
1798	....	59,928	59,928	William Stevens.
1799	....	42,704	42,704	William Stevens.
1800	....	50,000	50,000	William Stevens.
1801	....	62,000	62,000	Sheldon Logan.
1802	....	75,000	75,000	Asa Danforth.
1803	....	90,000	90,000	Asa Danforth.
1804	....	100,000	100,000	Asa Danforth.
1805	....	154,071	154,071	William Kirkpatrick.
1806	....	122,577	122,577	William Kirkpatrick.
1807	....	175,448	175,448	P. H. Ransom.
1808	....	319,618	319,618	Nathan Stewart.
1809	....	128,282	128,282	John Richardson.
1810	....	452,050	452,050	William Kirkpatrick.
1811	....	200,000	200,000	William Kirkpatrick.
1812	....	221,011	221,011	William Kirkpatrick.
1813	....	226,000	226,000	William Kirkpatrick.
1814	....	295,000	295,000	William Kirkpatrick.
1815	....	322,058	322,058	William Kirkpatrick.
1816	....	348,655	348,655	William Kirkpatrick.

1817		408,655	408,655	William Kirkpatrick.
1818		406,540	406,540	William Kirkpatrick.
1819		548,374	548,374	William Kirkpatrick.
1820		458,329	458,329	William Kirkpatrick.
1821		526,049	526,049	William Kirkpatrick.
1822		481,562	481,562	William Kirkpatrick.
1823		726,988	726,988	William Kirkpatrick.
1824		816,634	816,634	William Kirkpatrick.
1825		757,203	757,203	William Kirkpatrick.
1826		811,023	811,023	William Kirkpatrick.
1827		983,410	983,410	William Kirkpatrick.
1828		1,160,888	1,160,888	William Kirkpatrick.
1829		1,129,280	1,129,280	William Kirkpatrick.
1830		1,435,446	1,435,446	William Kirkpatrick.
1831		1,514,037	1,514,037	N. H. Earll.
1832		1,652,985	1,652,985	N. H. Earll.
1833		1,838,648	1,838,646	N. H. Earll.
1834		1,943,252	1,943,252	N. H. Earll.
1835		1,209,867	1,209,867	N. H. Earll.
1836		1,912,858	1,912,858	Rial Wright.
1837		2,167,287	2,167,287	Rial Wright.
1838		2,575,033	2,575,033	Rial Wright.
1839		2,864,718	2,864,718	Rial Wright.
1840		2,621,305	2,621,305	Thomas Spencer.
1841	220,247	3,120,230	3,340,767	Thomas Spencer.
1842	163,021	2,128,882	2,293,908	Thomas Spencer.
1843	318,105	2,809,395	3,127,500	Rial Wright.

STATEMENT OF THE NUMBER OF BUSHELS OF SALT MADE AT THE ONONDAGA SALT SPRINGS, ETC.—(*Continued*).

DATE.	Solar.	Fine.	Aggregate bushels.	Superintendent.
1844	332,418	2,968,136	4,300,554	Rial Wright.
1845	353,454	3,408,903	3,762,358	Enoch Marks.
1846	331,705	3,507,146	3,838,851	Enoch Marks.
1847	262,879	3,688,476	3,951,355	Enoch Marks.
1848	342,497	3,994,629	4,737,126	Robert Gere.
1849	377,735	4,705,824	5,083,769	Robert Gere.
1850	374,732	3,894,187	4,268,919	Robert Gere.
1851	378,967	4,235,150	4,614,117	Robert Gere.
1852	633,595	4,288,938	4,922,533	Hervey Rhodes.
1853	577,947	4,826,577	5,404,524	Hervey Rhodes.
1854	734,474	5,068,873	5,803,347	Hervey Rhodes.
1855	498,124	5,584,761	6,082,885	Vivus W. Smith.
1856	709,391	5,257,419	5,996,810	Vivus W. Smith.
1857	481,280	3,830,846	4,312,126	Vivus W. Smith.
1858	1,514,554	5,518,665	7,033,391	Vivus W. Smith.
1859	1,345,022	5,549,250	6,894,271	Vivus W. Smith.
1860	1,452,565	4,130,682	5,593,247	Vivus W. Smith.
1861	1,884,697	5,315,549	7,200,391	Vivus W. Smith.
1862	1,983,022	7,070,852	9,053,874	Vivus W. Smith.
1863	1,437,656	6,504,727	7,842,383	Vivus W. Smith.
1864	1,971,122	5,407,712	7,378,884	Vivus W. Smith.

1865	1,886,760	4,499,170	6,385,430	George Geddes.
1866	1,978,883	5,180,320	7,158,503	George Geddes.
1867	2,271,892	5,323,673	7,595,565	George Geddes.
1868	2,027,490	6,639,126	8,666,616	George Geddes.
1869	1,857,942	6,804,285	8,662,237	George Geddes.
1870	2,847,691	6,260,422	8,748,115	George Geddes.
1871	2,464,404	5,910,492	8,374,956	John M. Strong.
1872	1,882,604	6,048,321	7,930,925	John M. Strong.
1873	1,691,359	5,768,998	7,460,357	John M. Strong.
1874	1,667,368	4,361,932	6,029,300	A. C. Powell.
1875	2,665,955	4,523,491	7,179,546	A. C. Powell.
1876	2,308,679	3,083,998	5,392,667	A. C. Powell.
1877	2,525,335	3,902,648	6,427,983	A. C. Powell.
1878	2,788,754	4,387,443	7,176,197	A. C. Powell.
1879	2,957,744	5,364,418	8,322,162	A. C. Powell, 8 months. C. G. Hinkley, 4 months.
1880	2,516,485	5,482,265	7,998,750	N. Stanton Gere.
1881	3,011,461	4,905,767	7,917,236	N. Stanton Gere.
1882	3,032,447	5,307,773	8,340,180	N. Stanton Gere.
1883	2,470,533	5,432,439	7,902,972	P. J. Brummelkamp.
1884	2,353,860	4,588,409	6,942,259	P. J. Brummelkamp.
1885	2,439,332	4,494,967	6,934,299	P. J. Brummelkamp.
1886	2,772,348	3,329,409	6,101,757	P. J. Brummelkamp.
1887	3,118,974	2,576,823	5,695,797	P. J. Brummelkamp.
1888	3,115,314	2,542,053	5,657,367	P. J. Brummelkamp.
1889	2,916,923	2,448,138	5,365,061	P. J. Brummelkamp.
1890	2,726,471	2,201,651	4,928,122	P. J. Brummelkamp.

STATEMENT OF THE NUMBER OF BUSHELS OF SALT MADE AT THE ONONDAGA SALT SPRINGS, ETC.—(*Concluded*).

DATE.	Solar.	Fine.	Aggregate bushels.	Superintendent.
1891	2,113,727	1,735,186	3,948,914	P. J. Brummelkamp.
1892	3,122,789	1,282,885	4,405,674	P. J. Brummelkamp.
1893	2,332,052	733,854	3,065,906	P. J. Brummelkamp.
1894	2,355,394	871,859	3,227,254	P. J. Brummelkamp.
1895	2,608,289	605,835	3,214,125	P. J. Brummelkamp.
1896	2,464,422	342,178	2,806,601	Charles Hiscock.
1897	2,500,691	341,503	2,842,195	Charles Hiscock.
1898	2,044,924	428,456	2,473,381	Charles Hiscock.
1899	2,089,981 $\frac{14}{56}$	412,590 $\frac{7}{56}$	2,502,571 $\frac{21}{56}$	Charles Hiscock.
1900	2,422,803 $\frac{9}{56}$	337,947 $\frac{12}{56}$	2,760,750 $\frac{21}{56}$	Charles Hiscock.
1901	2,235,250 $\frac{36}{56}$	374,841 $\frac{51}{56}$	2,610,092 $\frac{22}{56}$	Charles Hiscock.
1902	1,491,578 $\frac{25}{56}$	186,175 $\frac{42}{56}$	1,677,754 $\frac{20}{56}$	Charles Hiscock.
1903	1,837,423 $\frac{21}{56}$	95,800 $\frac{53}{56}$	1,933,224 $\frac{18}{56}$	Charles Hiscock, 10 months. Hoyt H. Freeman, 2 months.

ANNUAL REPORT

OF THE

WYOMING BENEVOLENT INSTITUTE

FOR THE YEAR 1903.

TRANSMITTED TO THE LEGISLATURE, JANUARY 14, 1904.

ALBANY
OLIVER A. QUAYLE
STATE LEGISLATIVE PRINTER
1904

STATE OF NEW YORK

No. 15.

IN ASSEMBLY,

JANUARY 14, 1904.

ANNUAL REPORT

OF THE

WYOMING BENEVOLENT INSTITUTE.

BUFFALO, N. Y., *November* 16, 1903.

To the Honorable FRANK W. HIGGINS, *Lieutenant-Governor and President of the Senate:*

Sir.—By direction of the Board of Trustees of the Wyoming Benevolent Institute, I have the honor to transmit herewith the annual report of the Board to the Legislature for the year ending September 30, 1903.

I am, sir, yours with great respect,

EDWIN P. SEARS,

Secretary.

Officers of the Wyoming Benevolent Institute.

Trustees.

OGDEN P. LETCHWORTH........................President
HENRY R. HOWLAND.........................Treasurer
EDWIN P. SEARS..................................Secretary
ISABEL HOWLAND, HENRY A. PIERCE.

Superintendent.

WILLIAM PRYOR LETCHWORTH......Portage P. O., N. Y.

Librarians.

Miss A. E. McCLOUD. Miss ETTIE KANE.

REPORT.

To the Honorable the Legislature of the State of New York:

In compliance with chapter 479, section 5, of the Laws of 1870, the undersigned trustees of the Wyoming Benevolent Institute respectfully report on the affairs and management of the Institute and submit a statement of the funds and property of the corporation in their charge and under their control, with the items of receipts and disbursements, for the year ending September 30, 1903.

The twelve acres of land on lot No. 90 of the Cottringer Tract and belonging to the corporation have been leased for farming purposes during the past year.

The property of the Institute known as Prospect Home Villa, which was a gift to the corporation in 1900, is in good condition. The land belonging to this valuable property contains about 59 acres. This includes a pleasant woodland tract bordering on the banks of the Genesee River, good meadow and pasture land, a garden lot containing a variety of small fruit, and a large apple orchard of desirable varieties of fruit.

The house is a comfortable structure accommodating from twenty to twenty-five persons, and is supplied with clear spring water from the premises. The situation is elevated and free from all malarial influences, being from 400 to 500 feet above the water of the Genesee River, which flows past it. The views from the building are commanding, taking in wide stretches of the far-famed Genesee Valley. The property is situated in the town of Genesee Falls, Wyoming county (Portage P. O., N. Y.), and lies between the Middle and

Lower Falls of the Genesee and is surrounded by scenery of great natural beauty. It is readily accessible from the Erie and Pennsylvania railways, which intersect at Portage. Considering the unusual advantages the place possesses for promoting the objects of the corporation, it is not easy to form a just conception of its value.

In consequence of serious obstacles arising in the way of receiving children at Prospect Home the work of the Institute has been confined during the past year to extending the use of the free circulating library at Glen Iris and its branch at Portageville. In addition to the number of volumes previously reported the list of periodicals has been increased. The benefits of the library appear to be appreciated by the community having access to it.

A fund amounting to $45.77 is on deposit in the Bank of Castile, with which it is intended to purchase tools for use in industrial training when required.

The property of the Institute, which is under the supervision of Hon. Wm. Pryor Letchworth, superintendent, is in good condition.

The balance of cash on hand October 1, 1902, was $1,117.93. The amount of cash received during the year ending September 30, 1903, was $101.20. The amount disbursed was $87.90. The balance remaining on hand September 30, 1903, was $1,131.23. The Treasurer's report, which is appended hereto and constitutes a part of this report shows the details of the financial operations of the institution.

OGDEN P. LETCHWORTH,
HENRY R. HOWLAND,
HENRY A. PIERCE,
ISABEL HOWLAND,
EDWIN P. SEARS,
Trustees.

Dated Buffalo, N. Y., October 20, 1903.

Treasurer's Report.

Report of the Treasurer of the Wyoming Benevolent Institute for the year ending September 30, 1903:

Receipts.

1902.			
Oct.	1.	Balance on hand per last report..........	$1,117 93
1903.			
Jan.	1.	Interest credited by Buffalo Savings Bank..	15 47
July	1.	Interest credited by Buffalo Savings Bank..	15 73
Sept.	23.	Received for rent of land connected with Prospect Home	30 00
		Received for rent of land on Lot No. 90..	15 00
	26.	Donation from William P. Letchworth for general purposes of the Institute.......	25 00
			$1,219 13

Disbursements.

1902.			
Nov.	11.	Marine Bank for rent of safe....	$5 00
	22.	H. H. Sampson, magazine subscription	20 40
1903.			
June	5.	Miss Ettie Kane, for services as librarian in 1902..............	12 50

Sept. 17.	Miss Ettie Kane, librarian to September 30, 1903	$25 00	
	Miss A. E. McCloud, librarian to September 30, 1903	25 00	
			$87 90
Sept. 30.	Balance on hand		$1,131 23

HENRY R. HOWLAND,
Treasurer.

We, the undersigned, trustees of the Wyoming Benevolent Institute, certify that we have examined and compared the vouchers for the receipts and disbursements shown in the Treasurer's report and found the same to be correct.

OGDEN P. LETCHWORTH,
HENRY A. PIERCE,
ISABEL HOWLAND,
EDWIN P. SEARS,
Trustees.

Dated Buffalo, N. Y., October 20, 1903.

FORTY-EIGHTH ANNUAL REPORT

OF THE

BOARD OF MANAGERS

OF THE

THOMAS ASYLUM

FOR

ORPHAN AND DESTITUTE INDIAN CHILDREN,

LOCATED ON THE

CATTARAUGUS INDIAN RESERVATION

AT IROQUOIS, NEW YORK.

For the Fiscal Year Ending September 30, 1903.

TRANSMITTED TO THE LEGISLATURE JANUARY, 1904.

ALBANY
OLIVER A. QUAYLE
STATE LEGISLATIVE PRINTER
1904

STATE OF NEW YORK.

No. 16.

IN ASSEMBLY,

JANUARY, 1904.

FORTY-EIGHTH ANNUAL REPORT

OF

Board of Managers of the Thomas Asylum for Orphan and Destitute Indian Children.

Buffalo, N. Y., *October* 1, 1903.

To the Legislature of the State of New York:

Gentlemen.—By order of the Board of Managers of the Thomas Asylum for Orphan and Destitute Indian Children at Iroquois, N. Y., I have the honor to forward their report for the year ending September 30, 1903, with its accompanying papers.

Very respectfully,

HENRY R. HOWLAND,

President.

BOARD OF MANAGERS.

HENRY R. HOWLAND	Buffalo.
NEWTON A. CHAFFEE	Gowanda.
WILLIAM S. LAWTON	Lawtons.
Miss LILLA C. WHEELER	Portville.
SAMUEL G. KEYES	Gowanda.
JOHN SCHOEPFLIN	Hamburg.
JOHN C. WILBER	Buffalo.
JOHN JAMISON	Iroquois.
WALLACE JEMISON	Bascom.
ALFRED JIMESON	West Salamanca.

OFFICERS OF THE BOARD.

President,

HENRY R. HOWLAND.

Secretary,

NEWTON A. CHAFFEE.

Treasurer,

SAMUEL G. KEYES.

OFFICERS OF THE ASYLUM.

Superintendent,

GEORGE I. LINCOLN.

Matron,

EMILY P. LINCOLN.

Assistant Matron,

HALLA WELLS.

Teachers,

ROLAND DANN,
MARY S. MORGAN,
LOUISA WALLACE.

Kindergarten,

DONNA I. COLLINS.

Music,

NETTIE REYNOLDS.

Physician,

A. D. LAKE, M. D.

Oculist,

ALVIN A. HUBBELL, M. D.

REPORT.

To the Legislature:

As required by the statute, the Board of Managers of the Thomas Asylum for Orphan and Destitute Indian Children beg leave to present their report for the fiscal year ending September 30, 1903.

There were 145 children in the institution on the first of October, 1902, since which time 19 boys and 11 girls have either been placed in families or returned to parents or guardians and thus discharged from the institution, and 37 children have been received into the institution, so that there are at present 59 boys and 93 girls under our care, making a total population of 152 children at the present date.

We are very glad to report that no deaths have occurred during the year. The report of the attending physician will call your attention to the excellent health of the children in general, the result of good sanitary conditions, abundance of outdoor work and exercise, suitable diet and proper clothing. In this connection we deem it proper to say that the allowance for clothing and provisions is, in our judgment, hardly sufficient, as it does not enable us to provide all the clothing that is really needed, nor are we able to provide a dietary which, in our judgment, is sufficiently generous.

The report of school work for the year is in the main very satisfactory, but we greatly need an industrial school building, for which we have asked an appropriation for several years. We deem it of the utmost importance that these boys should be trained in trade work and the girls in domestic science more largely that it is possible to do at the present time. As the population has increased materially during the year, the school building is even more overcrowded than at the date of our last report, and the changes then suggested in location of toilet rooms and in the addition of another classroom are much needed.

The superintendent asks permission to purchase or lease 40 or 50 acres of land in addition to that which we now have, inasmuch as the farm is not large enough to meet the present demands of the institution. We believe that this purchase would be desirable. The superintendent also asks for the employment of a gardener, by which he means, as he states, a person thoroughly competent to give instruction in gardening and farming and in the care of dairy products. This is of especial importance in connection with these Indian children, as the great majority of the boys will become farmers and the girls will become farmers' wives. We commend this to your consideration.

It is gratifying to the Board of Managers and to the friends of this institution to see the positive evidences of good results from its training, to which the superintendent calls attention in his report and of which he gives the details. The object of this training has been to teach these Indian children a self-reliance based upon a knowledge of the better ways of civilization and their own fitness therefor; that they may rightly value moral rectitude and proper obedience to the laws of physical health and of cleanly living; that they may learn how to think and how to use their hands, and how they may best become self-helpful men and women —helpful not only to themselves but to those of their own race who may not have had the same advantages, but who feel their good influence and are led to profit thereby.

The superintendent's report, which is marked Appendix A, is respectfully submitted; also the report of the treasurer, Mr. Samuel G. Keyes, marked Appendix B, and the report of the attending physician, Dr. A. D. Lake, marked Appendix C, while Appendix D gives the names and nationalities of the children, showing the reservation from which each is received, and Appendix E gives a statement of the real and personal property of the institution.

HENRY R. HOWLAND,
President.
SAMUEL G. KEYES,
LILLA C. WHEELER
NEWTON A. CHAFFEE,
JOHN SCHOEPFLIN,
JOHN C. WILBER,
WILLIAM S. LAWTON,
WALLACE JEMISON,
JOHN JAMISON,
ALFRED JIMESON.

APPENDIX A.

SUPERINTENDENT'S REPORT.

To the Board of Managers of the Thomas Asylum for Orphan and Destitute Indian Children:

I present you herewith for your consideration and transmittal to the Legislature, as required by law, my annual report as superintendent for the year ending September 30, 1903.

The prediction that was made to you in my last annual report that the low per capita cost of last year could not successfully be maintained for the present year has proven to be a fact, and there has been a small increase in the per capita cost of maintenance. But I do not consider the present cost high; on the contrary, it is low, too low to permit of the carrying out successfully all of the objects and aims for which the institution was founded and incorporated.

It is my strong conviction that a more liberal policy should be pursued in the management and control of the institution; that its scope of education and training should be broadened so as to embrace the important trades— those trades that are most commonly employed in the country such as carpentry, painting and masonry. Education along these lines is no longer experimental. Its advantages and benefits are conceded by all who have given it careful and thoughtful attention. We are now giving instruction in a small way in these important branches, but we can not successfully prosecute the work unless the necessary equipment be provided. An industrial building is the first requirement, and it is my hope that the Legislature will soon be convinced of its necessity and importance.

Permit me to say in this connection that I think the time has come when the name of the institution should be changed from the "Thomas Asylum" to the "Thomas Indian School." The educational feature of the institution is the predominating one, and it should be given a name in keeping with its work.

Greater attention and more intelligent consideration should also be given to agriculture. This is an important vocation, and the people are awakening to the fact that it is just as necessary to acquire a knowledge of this calling as that or any other trade or profession if it be made profitable. There should be in the employ of the institution a person thoroughly competent to give instruction in gardening and farming and the care of dairy products. It is not sufficient that the pupils simply be employed on the farm and in the garden at the ordinary routine work, but they need to be given instruction as to the kind of vegetables to plant on certain kinds of soil, its proper cultivation and tillage, the sort of crops that would be most productive, the quantity of seed needed and the time for planting, etc. They also should be instructed in the care of milk and its manufacture into the various products, especially that of butter; the care of the stock, the ventilation of the barns, the kind and variety of feed to increase the flow of milk; in fact, an almost unlimited number of questions that must be understood by a successful farmer. This is really an important industry and the most natural one for these Indian boys, as more of them will follow it for a livelihood than any other trade or calling.

The work in the school has been along the same lines that have been followed for the past two or three years and the same course of study pursued. The graduating class was not large but the exercises were exceedingly interesting nevertheless, and the address given by the Hon. Carey D. Davey was instructive and most thoroughly appreciated. The large number in attendance from the reservation and surrounding towns was an earnest of the interest that is felt in the institution and its pupils.

The large girls are employed about the institution—in the laundry, kitchen and bakery. They are taught how to do ordinary household work; and each girl after she reaches a certain age is taught how and required to do her individual laundry work in the ordinary way and not by the use of machinery. The girls are also employed in the sewing-room and given instruction in plain sewing, mending and darning, there being two classes each day in charge of the teachers, and the older girls, so far as it is profitable or practicable, are taught how and required to make their own clothes, particularly those for every-day wear. The boys have assisted in the general work of the farm and in the garden, the planting, cultivating and the harvesting of the crops, the care of the stock, and have worked with the carpenter and painter in making the ordinary repairs.

The farm is a valuable adjunct to the institution. It produced fully one-half of all of the food supplies consumed the past year. This supply, however, could be largely increased and its variety varied by the employment of a vegetable gardener. The employment of this gardener, I am convinced, would not increase the expense of the institution, but on the contrary, it would effect a saving, for the extra amount of provisions produced would more than cover his salary, and besides the boys would have the benefit of the instruction in this line of work that would be of great value to them.

In this connection I wish to renew my recommendation of last year for the purchase or lease of from 40 to 50 acres of land. The farm is not of sufficient size to meet the demands of the institution, and provision must soon be made for additional acreage.

Taken as a whole, I feel that the year just past has been most successful; that the influence of the institution has been uplifting; that those children who have gone out during the year, whether they have graduated or not, are better fitted to take up the duties of life and its responsibilities, and better prepared to earn a livelihood than they would be without the training they have received here; they will, in fact, make better citizens, thus enriching the State by adding to its wage-earning capacity.

The remark is sometimes made that it is a waste of time and money to attempt the education of these boys and girls or to train them in the trades, claiming that in a short time after they leave the institution they drift back to the reservation and soon fall back into the ways of their fathers and of their grandfathers and are Indians still.

That the Indians have and always will have characteristics peculiar to their race is admitted by all, and we do not claim or pretend to change those characteristics. The elm can not be cultivated until it becomes an oak, nor the oak be cultivated until it becomes an elm, neither can an Indian be trained and educated to the extent of eliminating those characteristics that are peculiar to his race. They are the characteristics that distinguish him as an Indian and it would be folly on the part of any one to try to change them, but we do aim to improve his condition by giving him a higher and nobler conception of life, and we have demonstrated thoroughly that education and Christian training will do this; that it makes of them respectable men and women; that it inspires them with greater ambition and loftier purposes; that it increases their usefulness, and that it makes of them better citizens and neighbors. We know that the majority of the children who have gone out from the institution during the past eight years live better and cleaner lives; that their influence has been elevating and broadening; that they certainly are more self-helpful and more self-reliant than those who have received no education. We have convincing proof of this in the reports that we are constantly receiving.

For several years past we have followed the plan of placing some of the older boys and girls in families during the summer vacation. The boys have usually been employed on farms and the girls as domestics, and almost invariably from the people with whom these children have been placed we receive complimentary reports. Permit me to quote from a letter received from Mr. J. B. Smallwood, for whom one of the boys worked the past vacation:

"The boy fits into affairs here admirably; he is interested in everything and everybody. You could not have sent us a nicer or better boy. He is handling a yoke of steers and breaking them himself, and wants to show them at the county fair. How long can you let him stay? I am willing to pay him $14 per month until November."

Mr. Smallwood also stated in a personal interview:

"We never had a better boy of any nationality in our employ. He shows that he has had excellent training; he is a credit to you and the institution."

Also permit me to quote from a letter from Mrs. Buell, in whose home one of the girls has been employed for two or three vacation periods and is now and has been since she graduated last June:

"She has been a good and faithful girl, and while disappointed that she was not going away to school with the other girls, has now settled down contentedly. She has done her share of the work with a patient and loving spirit. And we all grow more and more attached to her and want to keep her. What a good and far-reaching work you and Mrs. Lincoln are accomplishing in the world!"

Many of the boys who have gone out from the institution have found employment in the manufacturing establishments in the different cities, many more are employed on farms, and with hardly an exception they have proven to be efficient and most satisfactory employees. Some have been transferred to other institutions such as Carlisle Indian School, and Hampton Normal and Agricultural Institute, and we have pleasing and encouraging reports from these. Mr. Turner, the chaplain at Hampton Normal and Agricultural Institute, stated while here that they were especially pleased with the two boys whom we transferred to them last year; that they were doing good work, and that they show that they had received most excellent training while here. Several of our graduates desiring to pursue their studies further have entered other schools, some at Fredonia, some at Lima, some at Gowanda and one at Geneseo, and I am pleased to state that they are not disappointing us in the least, but are taking hold of their studies with a zeal and determination that would be creditable to any child.

Permit me to mention the case of one boy who after he left here graduated from Chamberlain Institute, then worked on a farm during the summer to get some money with which to buy clothing, then attended school a year at Fredonia, working for part of his board while there, and is now employed in the Brooks

Locomotive Works. He wrote me the other day that he had been promoted and had been given an increase in his wages. He is scrimping and saving on every corner and laying by every cent that he can get so that he may enter college next year.

The girls who have married and settled down on the reservation are making for themselves clean, respectable homes, and are bringing into use the training and instruction received while here. Their houses are neat, tidy and orderly, and their home life in every way is respectable. The older they grow the more forcibly they appreciate the education they have received.

The institution has certainly been productive of much good. The results that have been accomplished and are being accomplished every year are not easy to estimate. Its influence has extended to every reservation of the State, and it is a strong factor in the education, development and advancement of the Indians of the State and in their preparation for citizenship.

We have been constantly reminded during the year of the increased interest that the public is taking in the institution by frequent visits of prominent people from almost every section of the State and of many other States. Many of them have shown their genuine interest by generous contributions of money, magazines, papers and of other articles for the amusement and edification of the pupils. Space will not permit me to make special mention of each favor, but I assure you of our hearty appreciation of each and every one of them, and I wish to take this opportunity of extending to them our most hearty thanks, and I trust that their interest will continue and that the management will always be such as to merit approval.

The results that have been accomplished in the past, the improvements that have been made and the larger field of usefulness to which the institution has been advanced is due to the combined efforts on the part of all who have official connection with the affairs of the institution, and it is with pleasure that we extend our thanks to the State Board of Charities for its counsel and advice; to the Fiscal Supervisor of State Charities for his fair consideration of the needs of the institution; to the Board of Managers for their kind courtesy, wise counsel and loyal support, and to the teachers and employees for their fidelity and cooperation.

Respectfully submitted.

GEORGE I. LINCOLN,
Superintendent.

Iroquois, N. Y.

APPENDIX B.

REPORT OF S. G. KEYES, TREASURER.

Receipts.

Cash on hand October 1, 1902	$286 79
Received from Comptroller	26,000 00
Recieved from sale of old materials	6 75
	$26,293 54

Disbursements.

Salaries of officers and employes	$12,999 90	
Expense of managers	332 33	
Provisions	3,233 55	
Household stores	928 11	
Clothing	1,230 40	
Fuel and light	3,754 34	
Hospital and medical supplies	73 98	
Shop, farm and garden	1,888 86	
Ordinary repairs	153 01	
Transfer of inmates	42 62	
Miscellaneous	1,104 08	
Remittance to State Treasurer	6 75	
		25,747 93
Cash on hand October 1, 1903		$545 61

STATISTICAL REPORT.

Statement of Attendance for Fiscal Year Ending September 30, 1903.

Number of pupils in this institution October 1, 1902...	145
Number of pupils admitted during the last fiscal year..	37
Number of pupils discharged during the last fiscal year.	30
Number of pupils died during the last fiscal year......	..
Number of pupils in this institution October 1, 1903...	152
Average population for the last fiscal year ending September 30, 1903..................................	145,745

Expenditures for the Fiscal Year Ending September 30, 1903.

Salaries and wages of officers, employes, etc......	$12,999 90
Expense of managers...........................	332 33
Cost of provisions.............................	3,233 55
Total cost of maintenance......................	25,741 18
Per capita cost of maintenance.................	176 61

Appendix C.

REPORT OF ATTENDING PHYSICIAN.

To the Board of Managers:

I beg to submit herewith my report as attending physician for the year ending September 30, 1903.

The following named diseases have been under treatment during the year:

Abcess	3
Amenorrhœa	1
Bronchitis, acute	7
Burn	1
Chicken-pox	2
Chlorosis	2
Conjunctivitis	9
Contusion	6
Dyspepsia, acute	3
Eczema	9
Herpes	2
Inflammation middle ear	1
Influenza	1
Ivy poisoning	4
Kidneys, conjestion of	1
Lichen	2
Mumps	10
Pneumonia	7

Rheumatism	1
Scabies	11
Synovitis	1
Tuberculosis of lungs	2
Tuberculosis of glands	2
Tuberculosis of bone	1
Tuberculosis of joints	2
Wound	1
Dislocation, elbow	1

No deaths have occurred during the year.

It is very gratifying to note the continued decrease of tubercular affections among the children. Without doubt this is very largely due to the better sanitary condition of the institution and to the increased air-space made possible by the use of the new dormitories.

We can not divest ourselves, however, of the constant fear of infection which follows the reception of a case of consumption in the hospital. Here we have only two rooms in which patients can be kept—one for each sex. When consumptives are received they must be placed in one of these rooms, remaining in close contact with patients suffering from other diseases. The danger from communication of the disease thus becomes prominent. This danger would be averted during a part of the year by the use of tents.

This would also give these patients closer contact with the open air, a most desirable factor in the treatment of this affection.

Permit me again to advise that measures be inaugurated, if possible, for the transfer of our incipient cases of consumption to the State Sanitarium for Consumptives as soon as that institution is prepared to receive them.

Very respectfully,

A. D. LAKE,

Attending Physician.

Gowanda, N. Y., *September* 30, 1903.

APPENDIX D.

CATALOG OF CHILDREN, WITH THEIR NATIONALITY AND THE RESERVATION FROM WHICH EACH CAME.

ALLEGANY RESERVATION.

MALES.

	Nationality.
Blusky, Wilcus	Seneca.
Cooper, Lawrence	Seneca.
Gordon, Bertie	Seneca.
Halftown, Ora	Seneca.
Jimerson, Percy	Seneca.
Titus, Hector	Seneca.
Titus, Sylvester	Seneca.

FEMALES.

Crouse, Rhoda	Seneca.
Gordon, Olive	Seneca.
Jimerson, Gertrude	Seneca.
Jimerson, Margaret	Seneca.
Jimerson, Goldie	Seneca.

CATTARAUGUS RESERVATION.

MALES.

Bullus, Lafayette	Seneca.
Bishop, Willie	Cayuga.
Bishop, Harold	Cayuga.
Coats, Malcolm	Oneida.

	Nationality.
Clark, Adrian	Seneca.
Gordon Wesley	Seneca.
Jimerson, James	Seneca.
Jackson, Fillo	Munsee.
Jimerson, Arthur	Mohawk.
Johnnyjohn, Cleveland	Seneca.
Johnnyjohn, Mitchell	Seneca.
Jacobs, Wyman	Cayuga.
Johnson, Arthur	Seneca.
Johnson, Harvey	Seneca.
Johnson, Richard Lay	Seneca.
Jimerson, Franklin	Cayuga.
Jackson, Lindsay	Cayuga.
Kennedy, Raymond	Seneca.
Lay, Rutherford	Seneca.
Lay, Albert	Seneca.
Lay, Carl	Seneca.
Pierce, Sherman	Seneca.
Twoguns, Gurney	Seneca.
Twoguns, Harrison	Seneca.
Tallchief, Frank	Seneca.
Tallchief, Archibald	Seneca.
Thompson, Raymond	Seneca.
Thompson, Frederick	Seneca.
Thompson, Robert	Seneca.
Wilson, George	Seneca.
Warrior, Frederick	Cayuga.

FEMALES.

Button, Bessie	Seneca.
Button, Florence	Seneca.

	Nationality.
Blusky, Tillie	Seneca.
Boyle, Grace	Seneca.
Clark, Evangeline	Seneca.
Charles, Lucy	Seneca.
Crouse, Mamie	Seneca.
Darnell, Rhoda	Seneca.
Doxtator, Elsie	Seneca.
Doxtator, Alta	Seneca.
Doxtator, Ella	Seneca.
Ground, Flossie	Seneca.
Green, Louisa	Seneca.
Green, Bertha	Seneca.
Halftown, Libbie	Seneca.
Jackson, Marjory	Munsee.
Johnnyjohn, Betsy	Seneca.
Joe, Eunice	Seneca.
Joe, Nancy	Seneca.
Jimerson, Grace	Cayuga.
Jimerson, Marjory	Cayuga.
Johnson, Lizzie	Seneca.
King, Rachael	Seneca.
Lay, Theresa	Seneca.
Paul, Virginia	Abnakis.
Pierce, Gertrude	Seneca.
Snow, Alta	Seneca.
Snow, Julia	Seneca.
Snow, Effie	Seneca.
Snow, Elizabeth	Seneca.
Snow, Rose	Seneca.

	Nationality.
Snow, Hattie	Seneca.
Spring, Emma	Seneca.
Spring, Ruby	Seneca.
Tallchief, Louisa	Seneca.
Tallchief, Jennie	Seneca.
Thompson, Geneva	Seneca.
Thompson, Florence	Seneca.
Thompson, Lucy	Seneca.
Thompson, Lorenza	Seneca.
Thompson, Malphena	Seneca.
Waterman, Lilah	Seneca.
Wilson, Isabelle	Seneca.

ONONDAGA RESERVATION.

MALES.

Hill, Jason	Onondaga.
Hill, Levi	Oneida.
Hill, McCharthy	Onondaga.
Powlas, Gilbert	Onondaga.
Waterman, Chester	Onondaga.

FEMALES.

Gypson, Helen	Onondaga.
Gypson, Jennie	Onondaga.
Gypson, Lizzie	Onondaga.
Hill, Evelinda	Onondaga.
Hill, Mary	Oneida.
Hill, Laura	Oneida.
Hill, Nora	Oneida.
Hill, Maria	Oneida.
Hill, Lovina	Oneida.
Hill, Katie	Onondaga.

	Nationality.
Jacobs, Agnes	Onondaga.
Jacobs, Susie	Onondaga.
Jacobs, Laura	Onondaga.
Minnhan, Jennie Lind	St. Regis.

ONEIDA RESERVATION.

MALES.

Powlas, Baptist	Oneida.
Powlas, John	Oneida.

FEMALES.

Doxtator, Anna	Oneida.
Doxtator, Emma	Oneida.
Doxtator, Electa	Oneida.
Doxtator, Lucy	Oneida.
Doxtator, Ellen	Oneida.
Scanandoah, Dinah	Oneida.

SHINNECOCK RESERVATION.

MALES.

Beeman, Leroy	Shinnecock.

FEMALES.

Beeman, Lessie	Shinnecock.

TUSCARORA RESERVATION.

MALES.

Anderson, Robert	Tuscarora.
Sylvester, David	Tuscarora.
Thompson, Grover	Tuscarora.
Thompson, Oliver	Tuscarora.

FEMALES.

Anderson, Madelia	Tuscarora.
Anderson, Melissa	Tuscarora.
Chew, Sarah	Tuscarora.

	Nationality.
Chew, Barbara	Tuscarora.
Garlow, Ethel	Tuscarora.
Garlow, Winifred	Tuscarora.
Green, Mary	Tuscarora.
Green, Carrie	Tuscarora.
Henry, Eva	Tuscarora.
Henry, Esther	Tuscarora.
Jack, Augusta	Tuscarora.
Thompson, Myrtle	Tuscarora.
Williams, Virginia	Tuscarora.
Williams, Laura	Tuscarora.
Williams, Irene	Tuscarora.

TONAWANDA RESERVATION.

MALES.

Moses, Lawrence	Tonawanda.
Poodry, Dudley	Seneca.
Shanks, Grover Cleveland	Seneca.
Sundown, Failey	Seneca.
Skye, Wilber	Seneca.

FEMALES.

Blackchief, Rhoda	Seneca.
Charles, Minnie	Cayuga.
Charles, Ethel	Cayuga.
Skye, Lydia	Seneca.
Skye, Anna	Seneca.
Skye, Myra	Seneca.
Skye, Hazel	Seneca.
Skye, Mazie	Seneca.
Skye, Nettie	Seneca.

ST. REGIS RESERVATION.

MALES.

	Nationality.
Conners, Joseph	St. Regis.
Conners, John	St. Regis.
White, Mitchel	St. Regis.
White, Paul	St. Regis.

APPENDIX E.

INVENTORY OF THOMAS ASYLUM OCTOBER 1, 1903.

ADMINISTRATION BUILDING.

Building	$25,000 00

SUPERINTENDENT'S OFFICE.

One filing case and base	$20 00
One hundred filing boxes	35 25
One carpet sweeper	1 50
One floor brush	75
One waste-paper basket	25
One dictionary and stand	10 00
One revolving bookcase	11 00
Two card index cases	11 00
One letter file	6 00
Six document files	10 50
One large Brussels rug	7 00
One small Brussels rug	50
Three window-shades	60
Two small rugs	30
	$114 65

ACCOUNTANT'S OFFICE.

One Mosler safe	$50 00
One desk	15 00
One revolving chair	4 50
One typewriter desk	25 00
One stenographer's chair	3 00
One typewriter	15 00
One letter press and standard	3 50
One pigeonhole case	7 00
One large rug	4 50
One small rug	50
One waste-paper basket	25
	$128 25

PUBLIC OFFICE.

One large desk	$45 00
One high stool	1 50
One 10-foot table	15 00
Six chairs	12 00
One small desk	1 00
One large rug	10 00
One small rug	1 00
One picture (no value).	
	$85 50

PUBLIC RECEPTION HALL.

One large Brussels rug	$35 00
Three small rugs	5 50
One mottle rug	35
Five chairs	10 00

Two hall settees	$40 00
Three sofa pillows	1 50
One hall rack	5 00
One rocker	1 00
	$98 35

PUBLIC PARLOR.

Three rockers	$30 00
Three chairs	8 00
One table	10 00
Six pictures	10 00
Four window-shades	2 00
Four pair lace curtains	8 00
One pair portiers	6 00
One large Brussels rug	50 00
One small Brussels rug	1 00
One mottle rug	25
	$125 25

MATRON'S OFFICE.

One desk	$15 00
One revolving chair	6 00
One waste-paper basket	25
Two pictures	1 00
One window-shade	35
One large rug	12 00
One small rug	50
	$35 10

SUPERINTENDENT'S LIVING APARTMENTS.

One patent upholstered rocker	$18 00
One mahogany sofa	25 00
One upholstered rocker	12 00
Two mahogany chairs	9 00
One mahogany table	13 00
One Brussels carpet	50 00
One pair portiers	12 00
Three pair lace curtains	5 00
Three window-shades	1 00
One mahogany table	10 00
Two mahogany chairs	18 00
One mahogany divan	7 75
One pair portiers	12 00
One large Brussels rug	25 00
One small Brussels rug	75
Two window-shades	70
Three curtains	2 00
One dining-table	25 00
One sideboard	54 00
Eleven chairs	38 50
One arm chair	5 50
One large rug	24 00
One small rug	50
Four window-shades	1 40
Four pair lace curtains	4 00
Three beds	25 00
Three mattresses	30 00
Three mattress covers	1 50
Two dressers	50 00

One chiffonier	$16 00
Three pairs blankets	6 00
One table	4 00
One stand	2 00
Three rockers	4 50
One Morris chair	8 00
Nine window shades	3 00
Eight pairs white curtains	5 00
Eight sash curtains	2 40
Four large Brussels rugs	45 00
Four mottle rugs	3 00
Three small rugs	1 50
One chiffonier	9 00
One medicine cabinet	1 50
Two hampers	1 00
Six pillows	9 00
Nine sheets	2 25
Twelve pillow cases	1 40
Three table cloths	3 00
Two table felting	2 50
One and one-half dozen napkins	1 25
	$611 90

ROOM No. 1.

One bed	$5 70
One dresser	13 00
One commode	4 00
One chamber set	4 50
One picture	1 00
Two chairs	3 00

One pair curtains	$1 00
Two window-shades	50
One ingrain rug	5 00
One mottle rug	50
Two pillows	2 75
One mattress	12 00
One mattress cover	50
Eight sheets	2 00
Four pairs pillowcases	50
One pair blankets	4 00
One counterpane	1 50
	$61 45

ROOM No. 2.

One bed	$5 70
One dresser	13 00
One commode	4 00
One chamber set	2 00
One chair	1 50
One rocker	2 00
One ingrain rug	4 25
One mottle rug	50
One pair white curtains (no value).	
One window-shade	20
One mattress	11 00
One mattress cover	40
Two pairs blankets	5 00
Four sheets	60
Two pillowcases	30

Two pillows	$2 50
One counterpane	1 50
Five towels	75
	$55 20

ROOM No. 3.

Two single iron beds	$11 40
One dresser	13 00
One commode	4 00
One chamber set	3 00
Two rockers	2 00
One chair	1 50
One rug	5 50
Three shades	1 00
Three pairs white curtains	25
Two mattresses	17 00
Two mattress covers	80
Two pairs blankets	5 00
Two pillows	2 50
Two counterpanes	1 80
Six sheets	60
Four pillowcases	60
Seven towels	70
	$70 65

ROOM No. 4.

Two single beds	$11 40
One dresser	13 00
One commode	4 00
One rocker	1 50
One chair	1 50
One rug	5 00

Two mattresses	$17 00
Two mattress covers	80
Two pairs blankets	5 00
Two pillows	2 50
Two counterpanes	1 80
Two pairs white curtains	25
Two window-shades	60
Six sheets	60
Six pillowcases	60
Four towels	40
	$65 95

ROOM No. 5.

Two single beds	$11 40
Two rockers	2 50
One dresser	13 00
One chair	1 50
One rug	4 00
One small rug (no value).	
Two mattresses	17 00
Two mattress covers	80
Four pairs blankets	10 00
Three window-shades	1 00
Two pillows	2 50
Two counterpanes	1 80
Eight sheets	80
Five pillowcases	50
Four towels	40
	$67 20

ROOM No. 6.

Two beds	$11 40
One dresser	13 00
One table	4 50
Two chairs	3 00
One large rug	5 00
Two small rugs	75
Two window-shades	70
Two mattresses	17 00
Two mattress covers	80
Two pillows	2 50
Two counterpanes	1 80
Four towels	40
Seven sheets	70
Four pairs blankets	10 00
Six pillowcases	60
Two pairs sash curtains	30
	$72 45

BATHROOM.

One shade	$0 35
One sash curtain	15
Four rugs	1 50
One hamper	50
	$2 50

DINING-ROOM No. 2.

Seven window-shades	$2 00
Nine chairs	4 50
One sideboard	25 00

Two glass pitchers	$1 00
Four pictures	1 00
One table	2 50
One and one-half dozen napkins	75
Two tablecloths	1 50
One tablecloth (no value).	
	$38 25

SERVING ROOM.

One tank	$3 00
Table dishes	14 00
	$17 00

KITCHEN.

One range	$80 00
One table	3 00
One cabinet	12 00
One chair	15
One clock	75
Two rolling pins	20
Three potato mashers	25
One potato masher, wire	10
Three dripping pans	1 25
Four dippers	20
Seven basins	50
Three flatirons	75
Two bread boxes	1 00
Two cake boxes	1 00
One refrigerator	5 00
One chopping bowl	25
One tea kettle	1 50

One ice-cream freezer	$4 00
Five pans	1 00
Eight bread tins	80
One layer cake tin	25
Four loaf cake tins	40
One meat chopper	1 25
One chopping knife	25
One oatmeal cooker	1 25
Two skimmers	10
One ice crusher	2 00
Two iron spiders	1 00
Two sheet-iron spiders	1 00
Four gem pans	60
Two steamers	50
One toaster	10
One tea pot	35
One coffee pot	90
One waffle iron	3 00
One cooker	75
One stew kettle	50
One Chinese strainer	75
Two flour sieves (no value).	
Two hampers	1 00
Three scrub pails	30
One scoop	05
One frying kettle	2 00
Three dishpans	2 25
One meat roaster	1 00
One bread pan	75
One spice mill	75

One cake griddle	$1 00
Two cake turners	10
Two kitchen spoons	10
Two egg beaters	15
One biscuit cutter	05
One cookie cutter	05
Two five-quart pails	30
One one-gallon jug	10
Two butcher knives	50
One desk (no value).	
One can opener	05
Two dust pans	25
Two corn poppers	50
Two water sprinklers	50
One colander	10
	$140 50

STORE.

One table	$8 00
One desk no value).	
One counter	1 50
One pair scales	5 00
One coffee mill (no value).	
One waste-paper basket	25
	$14 75

DINING HALL.

Building	$23,000 00

KITCHEN.

One range and hood	$150 00
One coffee urn	155 00
One warming table	25 00
Three steam cookers	135 00
One bread cutter	7 00
One potato masher	8 00
One vegetable slicer	1 75
One cabinet	6 00
One small table	1 00
Two milk cans	3 00
Two tin cookers	1 25
One beating bowl (no value).	
Three griddles	1 50
One iron spider	75
One stew pan	75
Two granite dripping pans	50
One large sheet-iron frying pan	1 00
One small sheet-iron frying pan	25
One grater	05
Six dippers	25
One flour sieve	10
One granite stew kettle	50
One 20-gallon jar	1 75
Five brass drip basins	1 25
Three dripping pans	1 20
Three cake tins	30
Three pie tins	30
Six gem tins	75
Three large cake tins	75

One colander (no value).

One refrigerator	$17 00
Two agate dish pans	1 00
Two chopping bowls	25
Five shades	1 00
One large spoon	10
Two rolling pins	10
Two flatirons	40
One teapot	40
One coffee pot	40
One egg beater	10
One washboard	20
One cake turner	05
Two galvanized pails	50
Two syrup pails	30
One nutmeg grater	05
One sugar scoop	05
	$526 85

DINING-ROOM No. 1.

Fourteen tables	$105 00
One small table	7 00
One arm chair	1 25
Four dozen napkins	2 00
Twelve vinegar bottles	1 20
Nine spoon holders	90
Eleven dozen knives and forks	4 40
Twelve dozen large spoons	1 50
Three trays	1 00

Ten window-shades	$4 00
Five dozen bibs	2 50
Twelve pitchers	1 80
Twelve dozen bowls	12 00
Eleven dozen plates	9 90
Eleven dozen side dishes	4 95
One dozen tumblers	25
Twenty-seven tablecloths	20 00
Twelve platters	1 50
Fourteen salt and pepper shakers	1 25
Seven pictures	1 75
	$184 15

DINING-ROOM No. 2

Three tables	$10 00
Twenty-two chairs	11 00
Two sugar bowls	40
Three bells	30
Three cream pitchers	45
Three vinegar bottles	45
Five salt and pepper shakers	25
Two window-shades	60
One-half set dishes	2 50
Six dozen napkins	3 00
Ten tablecloths	9 00
Two dozen knives and forks	2 00
	$39 95

HALLS.

Twenty-seven window-shades	$8 00

ASSEMBLY ROOM.

One piano and stool	$250 00
Nine dozen chairs	130 00
One stand	1 50
Fifty-five songs of the century	7 00
One music cupboard	1 00
Three pictures	2 50
Eleven window-shades	3 50
	$395 50

DINING HALL ROOM No. 1.

One single iron bed	$5 70
One mattress	5 00
One mattress cover	25
Two pairs blankets	5 00
Three sheets	60
Two pillowcases	30
One counterpane (no value).	
One pillow	1 00
One dresser	13 00
One rug	40
One window-shade	25
One pair white curtains (no value).	
Two chairs	50
	$32 00

ROOM No. 2.

Two single iron beds	$11 40
One dresser	13 00
One stand	50
Two rockers	75
One chair	25
Two rugs	
One wardrobe	9 00
Two mattresses	10 00
Two mattress covers	50
Six sheets	1 20
Four pillowcases	60
Four pairs blankets	10 00
Two pillows	2 00
Two window-shades	70
One commode	1 00
Two counterpanes (no value).	
	$60 90

BATHROOM.

One hamper	$0 50
One rug	40
One window-shade	25
One chair	25
	$1 40

BAKERY.

One oven	$105 00
Two tables	1 50
One molding table	3 00

One bread box	$1 75
One screen cupboard	1 00
Twelve dozen bread tins	8 00
Two chairs	50
	$120 75

BASEMENT.

Thirty-six benches	$108 00

SEWING-ROOM.

Three window-shades	$1 50
Fourteen chairs	10 00
Two oak cupboards	5 00
Two sewing machines	10 00
One table	2 00
One long table	3 00
	$31 50

DORMITORY BUILDING No. 1.

Building	$13,000 00

FIRST GRADE DORMITORY.

Twenty beds	$80 00
Twenty mattresses	80 00
Twenty mattress covers	5 00
Twenty pillows	33 00
Forty pillowcases	4 00
Twenty blankets	70 00
Sixty sheets	6 00

One chiffonier	$10 00
One clock	5 00
One stand	4 00
One stand cover	25
One chiffonier cover	25
Eleven chairs	16 50
Twenty counterpanes	17 00
Forty towels	4 00
	$335 00

ATTENDANT'S ROOM.

One bed	$5 70
One dresser	11 00
One rocking chair	50
One mattress cover	25
One mattress	5 00
Three sheets	45
Two pillowcases	20
Two blankets	4 00
One pillow	1 75
One window-shade	25
One picture	1 00
One dresser cover	25
One rug	40
Two towels	25
One counterpane	85
	$31 85

DRESSING-ROOM.

Five window-shades	$1 50
One dresser	5 00
One commode	2 00
Three tables	1 50
	$10 00

SITTING-ROOM.

Six chairs	$5 00
One rocking chair	1 00
One rattan seat	4 25
Six pictures	3 00
One bookcase	3 00
One organ and stool	20 00
Three sofa pillows	60
One rug	20
One table	7 00
One waste-paper basket	30
Five window-shades	1 50
	$45 85

GIRLS' BATHROOM.

One hamper	$0 50
One window-shade	30
	$0 80

THIRD GRADE GIRLS' DORMITORY.

Twenty beds	$60 00
Twenty mattresses	55 00
Ten chairs	5 00

One chiffonier	$10 00
Twenty mattress covers	5 00
Fifty-eight sheets	8 70
Fifty pillowcases	5 00
Forty blankets (old)	5 00
Twenty pillows	15 00
Twenty counterpanes (old)	5 00
Forty towels	4 00
One chiffonier cover	15
One table	75
	$178 60

ATTENDANT'S ROOM.

One bed	$5 70
One dresser	7 50
One rocker	1 00
One mattress	5 00
One mattress cover	25
Four sheets	60
Two pillowcases	60
One pillow	1 75
Two blankets	4 00
One comfortable	1 25
One counterpane	65
One window-shade	35
One dresser cover	20
Three towels	30
	$29 35

SITTING-ROOM.

One table	$2 00
One rocker	1 00
Eight chairs	4 00
Four pictures	1 50
Five window-shades	1 50
	$10 00

DRESSING-ROOM.

One table	$1 00
Two window-shades	75
	$1 75

BATHROOM.

One hamper	$0 50
One window-shade	30
	$0 80

DORMITORY BUILDING No. 2.

Building	$13,000 00

SECOND GRADE GIRLS' DORMITORY.

Twenty beds	$80 00
Twenty mattresses	75 00
Ten chairs	3 00
One chiffonier	10 00
One stand	50
Twenty mattress covers	5 00
Sixty-three sheets	6 30

Fifty-one pillowcases	$5 10
Twenty blankets	30 00
Twenty blankets (old)	8 00
Twenty counterpanes	9 00
Twenty pillows	26 00
Thirty-seven towels	3 70
One chiffonier cover	15
	$261 75

ATTENDANT'S ROOM.

One single bed	$5 70
One dresser	11 00
One rocker	1 00
One mattress	5 00
One mattress cover	25
Three sheets	45
Two pillowcases	20
Two towels	20
Two blankets	4 00
One pillow	1 75
One counterpane	85
One window-shade	35
One dresser cover	15
One pair scrim curtains	25
One comfortable	1 50
	$32 65

SECOND GRADE GIRLS' SITTING-ROOM.

One table	$7 50
One rattan settee	4 50
One rocker	1 25
Twelve chairs	12 00
Five window-shades	1 75
Six pictures	3 00
	$30 00

BATHROOM.

One hamper	$0 50
One window-shade	30
	$0 80

DRESSING-ROOM.

Two window-shades	$0 75
One dresser	5 00
Two tables	1 00
	$6 75

NURSERY SITTING-ROOM.

One table	$1 00
One rocker	1 50
Eleven chairs	5 50
Five pictures	2 50
Five window-shades	1 50
	$12 00

DORMITORY.

Sixteen crib beds	$80 00
Four single beds	12 00
Fifteen crib mattresses	15 00
Four single mattresses	14 00
One chiffonier	10 00
One chiffonier cover	15
Sixty-two sheets	6 20
Fifty-six pillowcases	5 60
Twenty mattress covers	5 00
Five rubber sheets	3 75
Thirty-seven blankets (old)	15 00
Twenty pillows	5 00
Eighteen counterpanes	12 42
Two old counterpanes	40
	$184 52

ATTENDANT'S ROOM.

One single bed	$5 70
One dresser	11 00
One dresser cover	20
One chair	50
One rocker	1 00
One mattress	5 00
One mattress cover	25
Three sheets	60
Two pillowcases	20
One pillow	1 75
One counterpane	85
One window-shade	35
Two blankets	4 00
	$31 40

DRESSING-ROOM.

Two tables	$1 00
Two window-shades	70
	$1 70

BATHROOM.

One window-shade	$0 35
One hamper	50
	$0 85

SCHOOL BUILDING.

Building	$18,000 00

PRINCIPAL'S ROOM.

One hundred and ten school seats	$263 75
One desk	5 00
One teacher's chair	4 00
One call bell	50
One organ and stool	25 00
One clock	5 00
One slate blackboard	4 00
One bookcase and books	15 00
Thirty-one window-shades	12 00
One set encyclopaedias	20 00
One globe	12 00
One dictionary	5 00
One thermometer	25
One chair (old)	25
One window-opener	25
Four large wall maps	25 00
One set physiology charts	10 00
School books in use	75 00

Singing books	$15 00
Other books	40 00
Eighteen blackboard erasers	75
One waste-paper basket	25
Two pictures (no value).	
	$538 40

SCHOOL.

CLASSROOM No. 1.

One desk	$10 00
One teacher's chair	4 00
Twelve school seats (old)	24 00
Two slate blackboards	8 00
Three window-shades	1 20
Six blackboard erasers	30
One window-opener	25
One thermometer	10
One box drawing material	50
School books in use	10 00
One waste-paper basket	25
	$58 60

CLASSROOM No. 2.

One desk	$3 00
One teacher's chair	4 00
Twelve school seats (old)	24 00
Two slate blackboards	8 00
Four window-shades	1 60
One window-opener	25
Six blackboard erasers	30

One thermometer	$0 25
Five boxes drawing material	2 75
School books in use	30 00
One waste-paper basket	25
	$74 40

KINDERGARTEN.

One piano and stool	$75 00
One bookcase	15 00
Six long tables	15 00
Three short tables	4 00
One desk	2 00
One teacher's chair	2 00
Thirty-eight small chairs	9 50
Seven large pictures	7 00
Eight window-shades	4 00
One window-opener	25
Kindergarten material	25 00
Song books (old)	75
Four blackboard erasers	20
One waste-paper basket	20
	$159 90

LARGE BOY'S DORMITORY.

Building	$500 00
Twenty-six beds	$52 00
Twenty-six mattresses	52 00
One chair	50
Fifty-six blankets (old)	10 00
Fifty-two pillowcases	5 20

One bureau	$2 00
One dresser	3 00
Nine window-shades	1 80
Twenty-six pillows	13 00
Eighty sheets	8 00
	$147 50

LOWER DORMITORY.

Two sash curtains	$0 20
Seven beds	29 40
Seven mattresses	28 00
One chair	50
Fourteen blankets	21 00
Fourteen pillowcases	1 40
Ten sheets	1 50
One dresser	5 00
Seven pillows	11 55
Seven counterpanes (old)	1 75
Seven mattress covers	1 75
Five window-shades	50
	$102 55

ATTENDANT'S ROOM.

Two beds	$7 50
Two mattresses	6 00
Two mattress covers	75
Six sheets	90
Five Pillowcases	50
Four blankets	5 00

Two window-shades	$0 30
Two pillows	2 00
Two counterpanes	1 25
One commode	1 50
One rug	25
	$25 95

ASSISTANT MATRON'S ROOM.

One settee	$1 50
Two tables	6 00
Two dressers	8 00
Two rockers	....
One picture	2 00
Five towels	50
Four rugs (old)	40
	$18 40

BOYS' SITTING-ROOM.

One organ	$8 00
Two rockers	75
One table	50
Three chairs	75
One picture	50
Four window-shades	40
	$10 90

BOYS' PLAYROOM.

One bench	$3 00
Two tables	1 00
One chair	25
One bell	25
One clock	4 50
Three window-shades	30
	$9 30

ATTENDANT'S WORKROOM.

One rocker	$0 50
Three chairs	75
One hamper	50
One waste basket	25
	$2 00

SMALL BOYS' DORMITORY BUILDING.

Building	$100 00

ATTENDANT'S ROOM.

Two single iron beds	$8 40
Two mattresses	10 00
One mattress cover	25
One counterpane	50
Two pillows	3 50
Two blankets	4 00
Three shades	30

Six sheets	$0 60
Four pillowcases	60
One dresser	5 00
One commode	1 50
One chamber set	75
One chair	50
One rocker	75
One stand	50
Five towels	50
	$37 65

DORMITORY.

Twenty-one beds	$31 50
Twenty one mattresses	29 40
Twenty-one pillows	5 25
Thirty-six blankets (old)	9 00
One picture	25
Nine window-shades	1 00
Fifty-five sheets	5 50
Fifty-three pillowcases	5 30
	$87 20

PLAYROOM.

Two tables	$6 00
Five benches	10 00
Two chairs	50
Three pictures	1 50
One bell	25
Five window-shades	1 00
One linoleum carpet	1 50
	$20 75

WORKROOM.

One table	$0 50
One hamper	50
One chair	25
One stool	20
	$1 45

LAUNDRY.

One mangle	$325 00
One collar and cuff ironer	35 00
One shirt-ironer	15 00
Six ironing boards	1 20
Four clothes baskets	1 00
Two clothes crates	1 00
Five tables	1 50
One large washer	25 00
One small washer	15 00
Three wash boards	50
Sixteen flatirons	3 60
One soap kettle	50 00
One sorting case	2 00
One hand wringer	1 75
One coal stove	20 00
One gas stove	10 00
Four galvanized pails	1 00
One tin pail	15
One clock	1 00
One extractor	50 00
	$559 20

HOSPITAL.

Building	$2,000 00
One medicine case	$20 00
One tin medicine case	3 00
One desk	15 00
Two bedside tables	3 75
Two chiffoniers	15 00
One brass instrument table	15 00
Fourteen iron beds	58 80
Fourteen mattresses	70 00
Thirteen mattress covers	3 25
Thirteen pillows	24 50
Twenty sheets	3 00
Thirty-four pillowcases	3 40
Eleven counterpanes	7 15
Fourteen blankets	25 20
Six old blankets	1 50
Seven rocking chairs	7 00
Twelve chairs	6 00
One clock	3 00
Two screens	1 00
Nine pictures	4 25
Four rugs	1 75
One hamper	25
Thirty towels	3 20
One dining-room table	4 00
One sideboard	20 00
One set dishes	8 00
One sugar and creamer	75
Twelve knives	1 20

Twelve forks	$1 10
Eleven teaspoons	1 00
Four tablespoons	40
One Morris chair	6 00
One wheel chair	18 00
One refrigerator	9 40
One gas range	18 00
One kitchen table	1 50
Three tablecloths	1 50
One dozen napkins	1 25
	$367 10

BEDROOM.

One bedroom suite	$10 00
One large mattress	3 00
One large mattress cover	50
One small dresser	4 00
One wicker cot	1 00
One ingrain rug (no value).	
	$18 50

NURSE'S ROOM.

One bed	$5 70
One mattress	5 00
One mattress cover	50
Two blankets	5 00
Three sheets	45
Two pillowcases	20
One counterpane	65
One pillow	1 75

One dresser	$6 00
One ingrain rug (old)	75
One small rug	25
One rocker	75
One chair	50
One stand	75
	$28 25

CARPENTER SHOP.

Building (no value).

One grindstone	$0 75
One level	50
Five steel squares	3 75
Three 28-inch ripsaws	3 75
Two 26-inch crosscut saws (coarse)	2 50
Two 22-inch panel saws	1 50
One 12-inch back saw	75
One compass saw	15
Three wooden jack planes	1 25
Three wooden jointer planes	2 00
Three wooden smoothing planes	1 25
One iron jack (old)	1 00
Two small iron smoothing planes	2 00
One block plane	60
Three hammers (old), no value.	
One iron shave	50
Three 6-inch try squares	60
Two 6-inch bevel squares	40
One common bit brace	50
Ten bits	1 50

Ten chisels	$2 00
Seven gouges	1 25
One small plow	1 75
Three saw frames	1 00
Ten bracket saws	2 50
One large crosscut saw	2 00
Six thumb screws	1 50
One bucksaw	75
Two gages	15
Four small cabinet benches	8 00
Three carpenter benches (old)	2 00
One tool case and cupboard	2 50
One glue pot	25
One drafting table	1 50
One looking-glass	1 75
Two hundred sheets sand paper	1 00
Thirty chair bottoms	3 00
Two 5-inch clamps	75
	$58 90

EMPLOYEES' COTTAGE.

Building	$100 00

Four pictures	$1 00
One rocker	1 00
One table	5 00
Two chairs	1 00
One commode	1 00
One dresser	3 50
Two beds	8 00
Three pillows	2 50

One chair	$0 50
Two mattresses	5 50
Five blankets	4 50
Eleven sheets	1 65
Ten pillowcases	1 00
One picture	25
Two beds	4 00
Two mattresses	4 00
Two pillows	1 50
Two counterpanes	80
Four blankets	4 00
One chair	50
One bed	2 00
One dresser	2 50
One chair	50
One mattress	2 00
One pillow	75
Two blankets	2 00
	$60 95

COW BARN.

Building	$3,000 00

Twenty cows	$500 00
Three heifers	45 00
One calf	8 00
Fifteen feeding pails	1 20
Two pair heavy sleighs	50 00
Three heavy wagons	75 00
Two wheelbarrows	1 00
One corn sheller	2 00

One feed cutter	$5 00
One ladder	1 00
Two pickaxes	75
One crosscut saw	1 00
One hammer	25
Two monkey-wrenches	1 00
One apple press	50
Two log chains	2 00
Two crowbars	75
One post bar	1 00
One lawn grader	35 00
One lawn roller	4 00
One potato marker	2 00
One garden cart	2 00
One pair clamp pincers	3 00
One Russell staple puller	1 00
One set Page wire fence tools	7 00
One upright closer	1 00
One reaper and binder	100 00
Three cultivators	12 00
Five potato hooks	1 25
Ten corn cutters	1 00
One pair pruning shears	50
Two scoop shovels	1 00
One spade	75
One half-bushel measure	50
Three shovels	1 50
Eight rakes	1 60
Ten hoes	2 00
Nine hay forks	2 70

Five dung forks	$3 00
One scythe and snath	75
Twenty-five bushel crates	1 00
	$880 00

HORSE BARN.

Building	$1,200 00

One carryall	$100 00
One truck wagon	20 00
One double carriage	50 00
One market wagon	40 00
One Concord wagon	15 00
One Concord wagon with top	60 00
One single buggy (no value).	
One pair bob sleighs	45 00
One pair light sleighs	10 00
One pair four-seated sleighs	35 00
One light blanket	75
Five heavy blankets	6 00
One pair stable blankets	2 00
One pair stable blankets	1 00
Four heavy lap robes	8 00
Three horse brushes	1 50
Two single harnesses (no value).	
Two light double harnesses	35 00
One heavy harness	30 00
Six halters	2 50
Two strings of bells	3 00
Two pails	50
One four-quart measure	40

One pair horses	$300 00
One pair horses	250 00
One horse	50 00
One wheelbarrow	2 00
One push broom	25
One hitch rope	25
Twenty feet rubber hose (old)	1.00
One Portland sleigh	5 00
One wagon jack	1 00
One bed	3 00
One mattress	2 00
Two sheets	20
One pillowcase	10
One pillow	75
Two blankets	1 50
One commode	50
One feather duster	20
One rocker	50
One chair	25
One broom	20
	$1,084 35

ENGINE HOUSE AND IRON ROOM.

One dynamo and engine, 45 horsepower	$1,500 00
One engine, 20 horsepower	200 00
One dynamo, 10 horsepower	100 00
One water heater	150 00
One hose reel	7 50
Six hundred feet 2-inch hose	150 00

One grindstone	$1 00
One mirror	1 00
One boiler feed pump	50 00
Three boilers, tubular	700 00
Two large pumps	275 00
One small pump (no value).	....
One plumber's force pump	3 00
One scoop shovel	75
One fire rake	50
One plumber's furnace	2 75
Four oil cans	40
One hack saw	25
Two hose carts	100 00
One clock	1 50
Two chain tongs	8 00
One hammer	40
One anvil	1 00
One pair pliers	75
Two cold chisels	60
One soldering iron	50
Six cast-iron wrenches	60
Four pump wrenches	1 00
Two 24-inch Stilson wrenches	2 50
One 36-inch Stilson wrench	1 50
One large stock and die	5 00
Two small stock and dies	4 00
Two 2-inch pipe tongs	3 00
One ¾-inch pipe tongs	75
One spirit level	1 00
Two pipe cutters	3 00

One pair iron shears	$0 50
One large pipe vice	3 00
One small pipe vice	1 00
One small vice	75
One wheelbarrow	1 00
	$3,283 50

CREAMERY AND ICE HOUSE.

Building	$400 00

One milk aerator	$3 00
Seventeen milk pails	4 50
Five can-coolers	7 50
One large churn	4 00
One small churn	2 00
One bench	1 00
One chair	25
Two meat saws	1 35
One cleaver	1 50
Two knives	50
One meat grinder	1 25
Two wooden butter bowls	1 00
Two 20-gallon jars	3 00
One milk can	1 00
One small table	50
One butter ladle	10
One milk strainer	25
One pair scales (old)	......
Two pairs ice tongs	1 00
One wheelbarrow	1 50

Six ice hooks	$3 00
One ice plow	20 00
One ice chisel	2 50
	$60 70

PIGGERY AND TOOL HOUSE.

Building	$600 00

Two breeding sows	$30 00
One boar	10 00
Eighteen shoats	180 00
Fourteen pigs	52 00
One swill cart and can	8 00
One swill sled	2 00
One mowing machine	40 00
One mowing machine	5 00
One hay rake	10 00
One hay tedder	20 00
One spring-tooth harrow (old)	....
One spring-tooth harrow	17 00
Two plows	14 00
One shovel plow	1 00
One grain drill	75 00
One grain drill (old)	....
One two-horse cultivator	25 00
One lawn mower	5 00
Three lawn mowers (old)	....
	$494 00

RECAPITULATION.

Administration building	$25,000 00
Superintendent's office	$114 65
Accountant's room	128 25
Public office	55 50
Public reception hall	98 35
Public parlor	125 25
Matron's office	35 10
Superintendent's living apartments	611 90
Room No. 1	61 45
Room No. 2	55 20
Room No. 3	70 65
Room No. 4	65 95
Room No. 5	67 20
Room No. 6	72 45
Bathrooms	2 50
Dining-room No. 2	36 25
Serving-room	17 00
Kitchen	140 50
Store	14 75
Dining-hall building	23,000 00
Kitchen	526 85
Dining-room No. 1	184 15
Dining-room No. 2	35 95
Halls	8 00
Sewing-room	31 50
Assembly room	395 50
Dining hall, Room No. 1	32 00
Dining hall, Room No. 2	60 90
Bathroom	1 40

Bakery	$120 75
Basement	108 00
Dormitory building No. 1	13,000 00
First grade girls' dormitory	335 00
Attendant's room	31 85
Bathroom	80
Dressing-room	10 00
Sitting-room	45 85
Third grade girls' dormitory	178 60
Attendant's room	29 35
Sitting-room	10 00
Dressing-room	1 75
Bathroom	80
Dormitory building No. 2	13,000 00
Nursery sitting-room	12 00
Dormitory	184 52
Attendant's room	31 40
Dressing-room	1 70
Bathroom	85
Second grade girls' dormitory	261 75
Attendant's room	32 65
Sitting-room	30 00
Dressing-room	6 75
Bathroom	80
School building	18,000 00
Principal's room	538 40
Classroom No. 1	58 60
Classroom No. 2	74 40
Kindergarten	159 90
Large boys' building	500 00

Large boys' dormitory	$147 50
Lower dormitory	102 55
Attendant's room	25 95
Assistant matron's room	18 40
Boys' sitting-room	10 90
Boys' playroom	9 30
Attendant's workroom	2 00
Small boys' building	100 00
Playroom	20 75
Attendant's workroom	1 45
Dormitory	87 20
Attendant's room	37 65
Laundry	559 23
Engine room	3,283 50
Hospital, building	2,000 00
Hospital	367 10
Nurse's room	28 25
Bedroom	18 50
Milk house, building	400 00
Milk house	60 70
Carpenter shop	58 90
Employees' cottage, building	100 00
Employees' cottage	60 95
Cow barn, building	3,000 00
Cow barn	880 00
Piggery and tool house, building	800 00
Piggery and tool house	494 00
Horse barn, building	1,200 00
Horse barn	1,084 35

INVENTORY OF SUPPLIES ON HAND AT THE THOMAS ASYLUM, SEPTEMBER 30, 1903.

12 pounds baking powder, at 32 cents	$3 84
16 pounds baking soda, at 4 cents	64
48 pounds crackers, at 5 cents	2 40
4 barrels flour, at $4.53	18 12
150 pounds rolled oats, at 2 7-9 cents	4 166
26 pounds cocoa shells, at 1 cent	26
49 pounds coffee, at 14 cents	6 86
14 pounds bacon, at 12 cents	1 68
107 pounds ham, at 13 cents	13 91
19 gallons molasses, at 22 cents	4 18
31 gallons syrup, at 26 cents	8 06
39 pounds raisins, at 8 cents	3 12
5 pounds allspice, at 12 cents	60
5 pounds cloves, at 12 cents	60
2½ pounds ginger, at 12 cents	30
6 pails jelly, at 70 cents	4 20
5 pounds pepper, at 12 cents	60
6 gallons vinegar, at 15.1 cents	906
2 bushels salt, at 32 cents	64
2 pounds oxalic acid, at 10 cents	20
6 shoe brushes	2 30
6 bottles vinegar	625
2 broilers, at 7 cents	14
9 scrub brushes	66
3 dozen brooms, at $3	9 00
4 whisk brooms	293
5½ dozen bowls	4 46
1 garbage can	1 33

21 pounds chloride of lime, at 5½ cents	$1	155
100 pounds copperas, at 1 cent	1	00
6 dozen coat hooks		75
4 hampers, at 75 cents	3	00
2 lantern globes, at 10 cents		20
9 packages matches, at 12½ cents	1	125
1 bottle sewing machine oil		125
3½ dozen plates	3	43
67 rolls toilet paper, at 10 cents	6	70
24 shoe polish, at 6¼ cents	1	50
2 silver polish, at 15 cents		30
4 stove polish, at 4 1-6 cents		166
6 potash, at 7½ cents		45
135½ pounds powdered silux, at 2½ cents	3	387
11 pounds starch, at 3½ cents		385
126 pounds Chip soap, at 4½ cents	5	67
42 pounds sal soda		357
1 toaster		07
2 rolls screen wire	6	33
1 corset		60
13 pair hose, at 9⅝ cents	1	251
1 pair shoes (men's), at $1.50	1	50
4 pair shoes (women's), at $1.50	6	00
1 pair shoes (misses'), at $1.35	1	35
2 pair shoes (boy's), at $1.20	2	40
4 dozen socks, at 90 cents	3	60
20 bunches shoelaces, at 4⅜ cents		875
5 suits	27	50
183 tons coal, at $2.50	457	50
34 carbons, at 3 21-25 cents	1	305

9 gallons engine oil, at 20 cents	$1 80
5 gallons kerosene oil, at 10 cents	50
2 dung forks, at $1.14	2 28
5 bars harness soap, at 11⅓ cents	566
6 shovels, at 31¼ cents	1 875
1 bottle crockery cement	08
14 gauges, at 28⅓ cents	3 966
85 pounds waste, at 7 cents	5 95
18 gauge washers, at 5 cents	90
2 kegs nails	4 70
3 boxes glass	8 10
3 dozen drawing pencils, at 35 cents	1 05
1 box slate pencils	14
1 gross pencils	1 15
40 tablets, at 3½ cents	1 40
	$665 84

THOMAS ASYLUM, IROQUOIS, N. Y.

Inventory of Home Products, September 30, 1903.

150 bushels apples	$30 00
50 bushels beets	12 50
6 bushels lima beans	3 00
30 bushels white beans	60 00
12 bushels buckwheat	6 00
560 bushels corn (in ear)	168 00
800 head cabbage	24 00
25 head cauliflower	1 50

50 bushels table carrots	$10 00
150 bushels Belgium carrots	30 00
8 bushels popcorn	6 00
5 bushels oyster plant	2 00
115 bushels onions	69 00
10 bushels parsnips	2 50
410 bushels potatoes	246 00
100 pounds pumpkin	50
125 bushels rutabagas	31 25
700 pounds squash	10 50
200 bushels turnips	40 00
40 bushels tomatoes	8 00
25 tons cornstalks	125 00
60 tons hay	600 00
645 bushels oats	258 00
12 tons straw	60 00
	$1,803 75

FIFTY-THIRD ANNUAL REPORT

OF THE

MANAGERS

OF THE

Syracuse State Institution for Feeble-Minded Children.

FOR THE YEAR 1903.

PART I.

TRANSMITTED TO THE LEGISLATURE JANUARY 14, 1904.

ALBANY
OLIVER A. QUAYLE
STATE LEGISLATIVE PRINTER
1904

MANAGERS.

The Rt. Rev. FREDERICK D. HUNTINGTON,
S. T. D., LL. D., D. C. L.
Maj. ALVA W. PALMER.
EDWARD SEGUIN VAN DUYN, M. D.
Hon. WALTER W. CHENEY.
Mrs. C. E. CROUSE.
WILLIAM H. WARNER, Esq.
Rt. Rev. P. A. LUDDEN.
FREDERICK A. LYMAN, Esq.

Ex Officio Manager.

Hon. CHARLES R. SKINNER, Supt. of Public Instruction.

Permanent Chairman.

The Rt. Rev. FREDERICK D. HUNTINGTON,
S. T. D., LL. D., D. C. L.

Secretary.

Mrs. CHARLES E. CROUSE.

Treasurer.

J. C. CARSON.

Executive Committee.

Maj. ALVA W. PALMER.
WILLIAM H. WARNER, Esq.
Hon. W. W. CHENEY.

OFFICERS.

Superintendent.

JAMES C. CARSON, M. D.

Matron.

Miss ALVIRA E. WOOD.

Steward.

WILLARD B. FARRINGTON.

Medical Assistant.

ROBERT MASON, M. D.

Assistant Matrons.

Miss LOUISE C. RICHARDS.
Mrs. A. W. LOSKY.

Housekeeper.

Miss ALICE M. PALMER.

Teachers.

Mrs. EMILY P. WILBUR.
Miss SARAH P. YOUNG.
Mrs. M. ELIZABETH COOK.
Mrs. OLIVE M. SAWTELLE.
Miss MARY F. COZZENS.
Miss CORNELIA S. DEUEL.
Miss MAY E. GAFFEY.
Miss K. FEATHERSTONE.
Miss JENNIE L. CLARK.
Miss MARY E. HOOVER.
Miss ADA P. WIDDRINGTON.

Stenographer.

Miss JULIA E. CHURCH.

Bookkeeper.

DEVERE E. SMITH.

Storekeeper.

NORELL E. SMITH.

STATE OF NEW YORK

No. 17.

IN ASSEMBLY,

JANUARY 14, 1904.

FIFTY-THIRD ANNUAL REPORT

OF THE

Managers of the Syracuse State Institution for Feeble-Minded Children.

To the Legislature of the State of New York:

Agreeably to the provisions of the act establishing this institution, the undersigned managers respectfully submit this their fifty-third annual report:

RESOURCES FOR THE YEAR.

Balance in bank October 1, 1902	$1,190 50
Receipts from State appropriations during fiscal year	93,695 92
Receipts from counties for clothing State pupils	8,313 00
Receipts from pay cases—board, instruction and clothing	2,803 71
Receipts from sale of productions of shop	79 75

Receipts from sale of farm products	$648 93
Receipts from sale of old material	156 04
Total	$106,887 85

DISBURSEMENTS.

Paid on account of maintenance	$93,420 56
Returned to Comptroller, chapter 572, Laws of 1899	12,001 43
Balance in bank October 1, 1902	1,465 86
Total	$106,887 85

CLASSIFIED SUMMARY OF EXPENDITURES.

On current expense account of the Syracuse State Institution for Feeble-Minded Children for the year ending September 30, 1903:

Salaries of officers and teachers*	$13,854 42
Wages and labor*	27,728 67
Expenses of officers and managers	89 86
Provisions	21,936 55
Household stores	3,523 43
Clothing	3,914 20
Fuel and lights	12,104 59
Hospital and medical supplies	680 12
Shop, farm and garden	5,341 55
Ordinary repairs	965 45
Transportation of inmates	90 81
Miscellaneous	3,190 91
Total	$93,420 56

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*Includes $3,143.49 expended for salaries and wages of employees engaged in the manufacture of and repairs to clothing and formerly charged to account of clothing.

ASSETS SEPTEMBER 30, 1903.

Balance in cash	$1,465 86
Due from individuals for board, instruction and clothing	554 67
Due from counties for clothing	1,500 00
Due from State Treasurer on unexpended appropriations	2,075 78
Total assets	$5,596 31

In the above exhibit the year's receipts and expenditures are shown in the form which has been heretofore followed in the annual reports of the managers. The item of receipts, $93,695.92, includes the direct appropriation in full of $77,000, that of a return of $15,261.22 from the State Treasury of miscellaneous receipts, and the unexpended balances of $1,434.70 of the appropriation for the previous year. The miscellaneous receipts mentioned include the remittance to the State Treasurer of $12,000 appropriated for the present year and $3,261.22 returned two years ago in excess of the amount appropriated for that year. The full amount "returned to Comptroller" for the year, $12,001.43, is shown under the table of disbursements and includes the amounts shown in the previous table under the heads of receipts from counties, from pay cases, from sale of shop and farm products, and from sale of old material.

The classified summary of expenditures is presented in the form required by the Bureau of Charitable Institutions, and is not materially different from the one followed by the institution for many years previous to the creation of that bureau. The manner of collecting the expenditures into the present summary items is, however, quite changed; as, for instance, in the item of clothing was formerly charged the wages of all persons engaged in the repair and manufacture of clothing; likewise the wages of those employed on the farm and in the garden were charged to the farm and garden, etc.; and many expenditures now incurred and placed to the account of shop, farm and garden were formerly included in the item of ordinary repairs.

As compared with the previous year the total expenditures show an increase in amount of about $500, the changes being as follows: A decrease of $358.35 in salaries and wages; of $1,309.05 in provisions; of $5.38 in hospital and medical supplies; of $183.43 in shop, farm and garden; of $411.81 in ordinary repairs; an increase of $1.59 in expenses of officers and managers; of $504.45 in household stores; of $53.53 in clothing; of $2,103.08 in fuel and light; of $22.74 in the transportation of inmates, and of $130.12 in miscellaneous—the principal changes, therefore, in the two years being a decrease in the cost of salaries and wages, in provisions, and in ordinary repairs, which was a little more than offset by the increase for fuel and light and household stores.

The appropriations for the current year aggregate $92,000, which, together with the balance on hand and unexpended amounts of former appropriations of about $4,000, will, it is believed, carry us safely through. Owing to the general increased cost of living, and the belief on the part of the managers that appropriations should be sufficient in amount to avoid the possibility of a deficiency, it was decided to recommend a direct appropriation for next year of $85,000.

It was also decided at the annual meeting to request special appropriations for the following purposes: For replacing two of the steam heating boilers; for continuing improvements in plumbing and the substitution of the shower bath for the old bath tubs throughout the various buildings; and for repairs and equipment, $1,000. For the first two purposes mentioned the State Architect has been requested to furnish an estimate and name the required amounts. The two boilers it is desired to replace have been in use for nearly thirty years; one of them has been pronounced unsafe by the insurance company inspector and the other is allowed to be used only at a low pressure. For the plumbing improvements and the shower baths the foundation, as it were, is already laid and a good start made under the appropriation of last year. The improvements effected consist of a new hot-water heater sufficient for supplying heated water to all of the buildings; a thorough rearrangement of the hot and cold water pipes; entire new plumbing and the introduction of the shower bath at the girls' building. These changes have already affected a material saving in the consumption of water, sufficient to return a good rate of interest on the expense incurred, and which will naturally be increased in a greater ratio as further changes of a like character are progressed.

The appropriation of $1,800 for a renewal of laundry machinery and repairs to the laundry (chapter 410, Laws of 1902) has been expended except about $125. New slate hand tubs have been provided in place of the old worn-out soapstone tubs, and four new metallic washers of larger capacity substituted for the six old ones which had performed almost daily service for the past seventeen years. A new cement gutter has also been laid underneath the tubs and washers to carry off the waste water; and all loose and broken tile in the laundry, ironing-room, and connecting corridor have been reset or replaced.

With the appropriation of $800 for installing a watchman's clock system (chapter 410, Laws of 1902) by the advice of the State Architect a contract was made with the Eco Magneto Clock Company of Boston, Mass., and the system completed ready for work early last winter. So far its operation has been entirely successful and satisfactory. A small amount of the appropriation, $22, was left unexpended.

By the same chapter 410, Laws of 1902, an appropriation of $1,200 for the erection of iron stairways in the main building and a reappropriation of $1,419.31 for improvements to steam heating were granted. During the vacation period in the summer months the old wooden stairways between the second and third and third and fourth floors, which turned in toward the center, were torn out and substantial iron stairways turning outward were erected. By this change in the direction of the treads the safety of the inmates in case of fire in the building was very much enhanced. With the funds appropriated for improving the steam heating a new and larger high pressure steam main was run from the engine and boilers through to the boys' building kitchen; the conduit for the steam and other pipes under the north wing was deepened and widened; the return steam pipe, which lay directly upon the grouted floor of the main basement, was raised above it; repairs were made to the boilers and engine; the top of the old chimney at the boiler house, which was in a crumbling condition, was torn down and rebuilt; all new pipe laid was covered and a large amount of old pipe recovered, besides other changes and improvements of a minor character.

By the Legislature of 1903 appropriations for special purposes (chapter 543, Laws of 1903) were made as follows: $700 for lowering the windows of the third story of the south wing; $1,000 for improvements in ventilation; $1,000 for repairs and equipment; $500 for drilling a well and providing a pump and windmill at Fairmount; and $300 for constructing a new telephone system among the various buildings. Work is in progress and well advanced under the above appropriations excepting those for improvements in ventilation and the telephone, the description of which will be deferred until another year.

For many years past in our annual reports and other ways the superintendent and managers of this institution have urged legislative attention to a more extended provision for the idiotic and feeble-minded. These appeals have been made with the most effective words at our command, and while we recognize the fact that our appeals have not been altogether unheeded, to which the asylums at Newark and Rome with their more than twelve hundred inmates now bear evidence, the demand is yet great and but little if at all diminished. Within the past two decades the opinions of philanthropists and those interested in sociological problems have been steadily advancing in a certain direction until now it has become among them an almost unanimously settled conviction that, as a matter of public policy, practically all of the feeble-minded class should be segregated and provided for by the State. Many and various are the reasons which have led up to this conviction and to most persons they are easily obvious. In this State to-day less than two thousand of the feeble-minded class are now provided for and, while the figures of the last census are not at hand, it is probable that the total number in the State is not far from ten thousand. About four-fifths of the total number are therefore yet unprovided for, and wherever they exist, in private families, in the communities where they reside, in the schools, orphan asylums or county houses, they are everywhere a menace and a blight, a misfortune both to themselves and to the public. For the present capacity of this institution the location is in every way all that could be desired, but to extend accommodation upon the limited acreage here is in our opinion neither wise nor practicable. To meet the demands, therefore, the buildings at Newark and Rome should be increased to the full capacity desired as rapidly as possible. Furthermore, we believe it is not too early to advocate the creation of a new and additional asylum in the State for the feeble-minded, the location of which should be at no great distance from the city of New York. In no other way do we believe that the needs of the feeble-minded can be attained and, with a rapidly increasing population throughout the State, it is a question of such vast public importance that delay can only end in accumulating burdens upon the State in the near future.

As a result of diligent, faithful service on the part of the superintendent and his subordinates it is our pleasure to again bear testimony to another year's efficient administration of the affairs of the institution. The monthly visitations required by the law of 1902 have made us more familiar with the work and our inspections have convinced us that order, comfort and happiness prevail among the pupils, and that the efforts being made in the training and development of their feeble minds are not vainly expended.

F. D. HUNTINGTON.
ALTA PEASE-CROUSE.
P. A. LUDDEN.
W. W. CHENEY.
F. A. LYMAN.
W. S. PECK.
A. W. PALMER.

Report of the Treasurer.

Alfred Wilkinson, *Treasurer of the Syracuse State Institution for Feeble-Minded Children, in current account with the* State of New York *for cash received and expended for the general supplies and salaries and wages of officers, teachers, attendants and employees of said institution, etc., during the year ending September* 30, 1903:

RESOURCES FOR THE YEAR.

Balance in bank October 1, 1902	$1,190 50
State appropriations for maintenance	93,695 92
Receipts from counties for clothing State pupils	8,313 00
Receipts from pay cases, board, instruction and clothing	2,803 71
Receipts from sale of productions of shops	79 75
Receipts from sale of farm products	648 93
Receipts from sale of old material	156 04
Total	$106,887 85

DISBURSEMENTS.

Warrants of executive committee for month of October, 1902	$7,214 37
Warrants of executive committee for month of November, 1902	8,891 91

Warrants of executive committee for month of December, 1902	$8,626 12
Warrants of executive committee for month of January, 1903	8,687 84
Warrants of executive committee for month of February, 1903	8,247 44
Warrants of executive committee for month of March, 1903	8,874 18
Warrants of executive committee for month of April, 1903	7,551 15
Warrants of executive committee for month of May, 1903	8,112 32
Warrants of executive committee for month of June, 1903	7,966 83
Warrants of executive committee for month of July, 1903	6,858 95
Warrants of executive committee for month of August, 1903	5,848 63
Warrants of executive committee for month of September, 1903	6,540 82
	$93,420 56
Returned to Comptroller, chapter 580, Laws of 1899	12,001 43
Balance in bank October 1, 1903	1,465 86
Total	$106,887 85

There was received and expended under special appropriations, chapter 708, Laws of 1901; chapter 594, Laws of 1902; chapter 410, Laws of 1902; chapter 543, Laws of 1902, and chapter 599, Laws of 1903, as follows:

Appropriation for improving the heating system, chapter 708, Laws of 1901, cash received from Comptroller September 17, October 9, 13, 20, 1902, and January 14, 1903	$1,238 30
Vouchers paid, aggregating	1,238 30
Balance appropriation unexpended	$1,419 31
Reappropriation for improving the heating system, chapter 599, Laws of 1903, cash received from Comptroller April 17, June 10 and 26, and July 22, 1903	$1,419 31
Vouchers paid, aggregating	1,419 31
Appropriation for sloyd, chapter 594, Laws of 1902, cash received from Comptroller	$300 93
Vouchers paid, aggregating	300 93
Balance appropriation unexpended	$395 22
Appropriation for installing watchman's clock system, chapter 708, Laws 1901, cash received from Comptroller April 18 and May 2, 1902	$777 88
Vouchers paid, aggregating	777 88
Balance appropriation unexpended	$22 12
Appropriation for iron stairways, chapter 410, Laws of 1902, cash received from Comptroller May 2, 1903	$12 00
Voucher paid	12 00
Balance appropriation unexpended	$1,188 00

Appropriation for laundry machinery, chapter 410, Laws of 1902, cash received from Comptroller June 19 and June 26, 1903	$1,674 50
Vouchers paid, aggregating	1,674 50
Balance appropration unexpended	$125 50

Appropriation for plumbing improvements, chapter 410, Laws of 1902, cash received from Comptroller January 21 and March 25, 1903	$6,546 50
Vouchers paid, aggregating	6,546 50

Appropriation for repairs and equipment, chapter 543, Laws of 1903, cash received from Comptroller August, 1903	$474 95
Vouchers paid, aggregating	474 95
Balance appropriation unexpended	$525 05

Appropriation for lowering windows, chapter 543, Laws of 1903, cash received from Comptroller August, 1903	$225 84
Vouchers paid, aggregating	225 84
Balance appropriation unexpended	$474 16

RECAPITULATION.

Total of special appropriations received and expended during the fiscal year ending September 30, 1903:

Improving the heating system, chapter 708, Laws of 1901, and chapter 599, Laws of 1903	$2,657 61
Sloyd, chapter 594, Laws of 1902	300 93

Installing watchman's clock system, chapter 708, Laws of 1901	$777 88
Iron stairways, chapter 410, Laws of 1902	12 00
Laundry machinery, chapter 410, Laws of 1902	1,674 50
Plumbing improvements, chapter 410, Laws of 1902	6,546 50
Repairs and equipment, chapter 543, Laws of 1903	474 95
Lowering windows, chapter 543, Laws of 1903	225 84
Total	$12,670 21

Special unexpended appropriations still available, chapter 594, Laws of 1902; chapter 410, Laws of 1902, and chapter 543, Laws of 1903:

Drilling well at Fairmount	$500 00
Improvements to ventilation	1,000 00
Laundry machinery	125 50
Iron stairways	1,188 00
Sloyd	395 22
Repairs and equipment	525 05
Lowering windows	474 16

Report of the Superintendent.

To the Managers of the Syracuse State Institution for Feeble-Minded Children:

Gentlemen—In accordance with the requirements of the law and your board I beg leave to submit the following report, exhibiting statistics and other matters connected with the administration of the affairs of the institution for the fiscal year ending September 30, 1903:

MOVEMENT OF THE POPULATION.

	Males.	Females.	Total.
Present at the beginning of the year	264	263	527
Absent on vacation	11	8	19
Since admitted	27	46	73
Readmitted	0	1	1
Total for the year	302	318	620
Discharged	17	59	76
Died	1	3	4
Present at the close of year	272	245	517
Absent on vacation	12	11	23
Total on the rolls	284	256	540
Average daily attendance	265	251	516

Total number of weeks' board furnished to the pupils	26,931

Total cost of maintenance and instruction of pupils, including all expenses, except clothing	$86,362 87
Cost of clothing	7,057 69
Total cost	$93,420 56

Average weekly cost of maintenance and instruction of pupils	$3 21
Average weekly cost, including clothing	3 47
Yearly per capita cost	180 68

The following are the causes of death of those who died during the year:

Measles and pneumonia	1
Pertussis and pneumonia	1
Phthisis pulmonalis	2
	4

HOSPITAL RECORD OF DISEASES TREATED.

Abscess	1
Adenitis, cervical	1
Abrasion	1
Bronchitis, acute	14
Burn	1
Chorea, acute	1
Contusion	1

Conjunctivitis, acute	10
Croup	1
Debility	4
Diarrhea	4
Diphtheria	3
Eczema, acute	2
Epilepsy	5
Erysipelas	2
Fractures	2
Gastritis, acute	25
Herpes Zoster	1
Hemorrhoids	3
Infected finger	1
Hordeolum	6
Impetigo contagiosa	1
Jaundice	2
Keratitis	1
Measles	38
Pertussis	9
Phimosis	6
Phthisis pulmonalis	4
Pneumonia	7
Rheumatism, acute	1
Ringworm	6
Scabies	1
Tonsillitis	7
Typhoid fever	1
Varicella	9
Wounds	2
Unclassified	40

OPERATIONS.

Amputation, fingers	2
Circumcision	6
Fistula in ano	1
Removal, tumor	1
Removal, ingrowing toenail	1
Removal, hemorrhoids	1
Removal, cervical glands	1
Thoracotomy	1

The following table presents the movement of pupils by counties for the year:

	Remaining Sept. 30, 1902.	Admitted.	Discharged.	Remaining Sept. 30, 1903.
Albany	20	1	1	20
Allegany	7	1	1	7
Broome	6	1	1	6
Cattaraugus	4	..	1	3
Cayuga	7	..	2	5
Chautauqua	6	1	2	5
Chemung	19	1	3	17
Chenango	2	1	..	3
Clinton	5	..	..	5
Columbia	12	1	2	11
Cortland	2	1	1	2
Delaware	5	1	2	4
Dutchess	6	..	2	4
Erie	42	11	7	46
Essex	2	..	..	2
Genesee	2	..	..	2

	Remaining Sept. 30, 1902.	Admitted.	Dis-charged.	Remaining Sept. 30, 1903.
Greene	2	..	1	1
Herkimer	4	..	1	3
Jefferson	4	1	..	5
Kings	39	4	7	36
Lewis	4	..	..	4
Livingston	4	1	..	5
Madison	7	..	..	7
Monroe	29	1	2	28
Montgomery	6	..	2	4
Nassau	1	..	..	1
New York	76	19	11	84
Niagara	6	..	..	6
Oneida	26	2	3	25
Onondaga	33	4	6	31
Ontario	11	..	1	10
Orange	9	1	2	8
Orleans	2	..	..	2
Oswego	6	1	2	5
Otsego	14	1	1	14
Putnam	..	1	..	1
Queens	4	..	..	4
Rensselaer	17	1	4	14
Richmond	1	..	..	1
Rockland	5	2	1	6
St. Lawrence	5	1	2	4
Saratoga	4	1	1	4
Schenectady	1	..	..	1
Schoharie	1	1	..	2
Schuyler	2	..	1	1

	Remaining Sept. 30, 1902.	Admitted.	Dis-charged.	Remaining Sept. 30, 1903.
Seneca	3	1	..	4
Steuben	9	1	..	10
Suffolk	1	..	..	1
Sullivan	5	..	..	5
Tioga	8	..	..	8
Tompkins	5	1	..	6
Ulster	15	1	4	12
Warren	3	..	..	3
Washington	3	1	..	4
Wayne	5	..	..	5
Westchester	12	4	3	13
Wyoming	3	1	..	4
Yates	3	2	..	5
New York State	1	..	..	1
Totals	546	74	80	540

The matron presents the following report of work done during the school hours by the sewing classes, one of boys and four of girls, and by the classes at tailoring, hosemaking and shoemaking.

BOYS' LIST.

Towels	453
Washcloths	66
Handkerchiefs	828
Pillow cases	287
Doormats	20
Neckties	247

Loops on towels	12
Bread cover	1
Roller towels	104
Bibs	192
Names on blankets	24
Suspenders, pairs	2
Sheets	67
Shirts	13
Puzzles sawed	36
Dustcloths	6
Work aprons	20

GIRLS' LIST.

Sheets	501
Dresses	470
Shirtwaists	23
Handkerchiefs	854
Nightdresses	139
Aprons	96
Collars	143
Dresses made over	61
Drawers	14
Pillow cases	184
Skirts	35
Tablecloths	29
Towels	358
Dustcloths	9
Napkins	302
Towels, hemstitched	22
Traycloths	11

Doilies, plate	31
Bureau covers	13
Bedspreads	7
Blankets restitched	22
Names on garments	60

Besides a large amount of crocheting, embroidery and other fancy work.

GIRLS' BUILDING LIST.

Aprons	77
Buttonholes	3,539
Bands	355
Blankets hemmed	11
Bibs	37
Bathing caps	6
Curtains, pairs	13
Dish cloths	35
Drawers	73
Dresses	170
Dressing sack	1
Garters, pairs	139
Holders	315
Handkerchiefs	214
Mattress covers	23
Napkins	184
New sleeves	533
Names sewed on	955
Nightdresses	74
Pillow cases	145
Pillow cases hemstitched	6

Sheets	95
Skirts	50
Shirtwaists	12
Towels	70
Tablecloths	10
Traycloths	2
Underwaists	76
Vests restitched	2
Wrappers	5

And a large amount of mending.

BOYS' TAILORING CLASS LIST.

Suits	280
Trousers	227
Coats	81
Overalls	76
Shirts	2
Girls' cloaks	4
Aprons	5
Blankets hemmed	31
Fur robe repaired	1

CLASS AT HOSEMAKING.

Boys' hose, pairs	743
Girls' hose, pairs	307
Hose refooted, pairs	928

And all of the mending.

CLASS AT SHOEMAKING.

Shoes, new, pairs	53
Shoes, repaired, pairs	4,034

And the repairing of harness.

FARM AND GARDEN PRODUCE.

The steward reports the following as the products of the farm and garden for the year ending September 30, 1903:

Apples, bushels, 235	$176	25
Apples, crab, bushels, 18	10	80
Asparagus, bunches, 3,500	210	00
Beans, butter and string, bushels, 58	72	50
Beans, Lima, bushels, 14	21	00
Beets, green, bunches, 2,000	60	00
Beets, green, bushels, 242	72	60
Beets, farm, bushels, 1,050	210	00
Cabbage, heads, 15,990	799	50
Cauliflower, heads, 164	16	40
Currants, quarts, 264	31	68
Corn, sweet, bushels, 289	216	75
Corn, fodder, tons, 50	250	00
Cucumbers, hothouse, dozen, 87	52	50
Cucumbers, pickling, 11,000	27	50
Carrots, bushels, 194	97	00
Carrots, farm, bushels, 578	115	60
Celery, bunches, 7,000	210	00
Cherries, quarts, 64	7	68
Chickens and poultry, pounds, 275	55	00
Chive, bunches, 58	1	74
Ensilage, tons, 200	1,000	00

Egg plant, dozen, 3	$4	50
Eggs, dozen, 760	152	00
Grapes, pounds, 2,800	140	00
Gooseberries, quarts, 70	5	60
Hay, tons, 250	3,250	00
Horseradish, bushels, 2	2	50
Lettuce, dozen, 596	214	56
Milk, quarts, 159,680	4,790	40
Oats, bushels, 818	351	74
Onions, bushels, 150	150	00
Onions, bunches, 7.500	225	00
Parsley, bunches, 311	9	33
Pears, bushels, 20	25	00
Peas, bushels, 115	143	75
Plums, bushels, 15	11	25
Potatoes, bushels, 2,000	900	00
Pumpkins, pounds, 7,000	35	00
Peppers, bushels, 13	22	75
Parsnips, bushels, 10	5	00
Pieplant, bunches, 1,875	93	75
Pork, pounds, 5.155	412	40
Raspberries, quarts, 450	45	00
Radishes, bunches, 4,350	130	50
Sage, bunches, 30		90
Salsify, bushels, 50	17	50
Spinach, bushels, 234	234	00
Squash, summer, bushels, 92	92	00
Squash, winter, pounds, 4,200	52	50
Straw, tons, 20	180	00
Strawberries, quarts, 830	99	60

Turnips, bushels, 215	$64 50
Turnips, farm, bushels, 100	20 00
Tomatoes, bushels, 226	169 50
Wheat, bushels, 150	135 00
	$15,900 03

The applications for admission received and placed on file during the year numbered one hundred and thirty-three, or nine less than for 1902. Of this number seventy-three were for boys and sixty for girls, being a little less preponderance of boys than has usually been the experience heretofore. Of the applications received ninety-two were accepted and forty-one rejected. Of those accepted thirty-two, all for boys, were still on file at the close of the year, awaiting vacancies. Of those rejected eight were under seven, and seven over fourteen years of age; five were helpless or unteachable; one was thought to be insane; and twenty were confirmed epileptics.

The admissions during the year were seventy-four, or one less than for the previous year. Of the number admitted twenty-seven were boys and forty-seven girls. The average daily attendance was five hundred and sixteen, or three less; and the total number under care and training, six hundred and twenty, or eight more than last year, and again exceeding the record number of any previous year.

The number discharged for the year was seventy-six, seventeen of whom were boys and fifty-nine girls, an increase of twenty over 1902; and the number of deaths four, three girls and one boy, or six less than for 1902, making a total of eighty vacancies by both discharges and deaths during the year, an excess of six over admissions. For these six vacancies applications had been accepted and the pupils not yet admitted at the close of the year.

Of those discharged one boy and one girl were thought to be self-supporting; fourteen boys and seven girls were removed or retained at home by parents; thirty-three girls were transferred to the Rome and seventeen to the Newark asylum; one girl, a confirmed epileptic, at our request was removed by a county official; and two boys eloped.

It will be thus observed that during the year fifty girls were transferred to the custodial asylums, but not a single boy. As a result, while all eligible applications received for girls throughout the year were promptly accepted those for boys were necessarily deferred until vacancies occurred in their order. At the close of the year thirty-two eligible applications were on file awaiting vacancies. In the month of October at this writing we have been able to accept a few boys whose applications date back to November and December, 1902. County officials have in some instances complained of the long delays occasioned. In such cases the situation has been fully explained and assurances given that each application would be considered in its order. Cordial relations have thus been maintained between the institution and the counties and it is believed that superintendents of the poor are generally well satisfied that our accommodations are fairly distributed.

Only four deaths occurred during the year, the smallest number in many years, and from which it is manifest that general good health prevailed. At only one period was there much sickness and that during epidemics of measles and whoopingcough, both prevalent at the same time; there were in all thirty-eight cases of the former and nine of the latter. Each of these diseases, with a pneumonia complication was the cause of one death, and tuberculosis of the other two. After twenty years experience among the feeble-minded our observation is that tuberculosis once established runs a rapid course, much more so than in normal persons. It is seldom that one survives more than a few months and many times but a few weeks after the diagnosis is made. We have never yet seen what might have been considered a *lingering* case.

Besides the above mentioned infectious diseases, three cases of diphtheria and one of typhoid fever also occurred, in all of which recovery followed. The case of typhoid was that of an employee and may not have had its origin upon the premises. In each of the cases of diphtheria antitoxin was promptly administered and the disease promptly responded to its efficacy. One of these cases and the severest of all was that of a nurse in the hospital. This nurse had been many years in the service and at various times had attended upon cases of diphtheria without contracting it and then, strangely, took the disease without any known exposure.

The average age of those who died was eighteen, the oldest being thirty and the youngest ten years of age.

Besides the general repairs to buildings and furniture, the putting up and taking down of awnings, storm-houses, door and window screens, the care of locks, tools, fire extinguishers and the local fire alarm system, the making of sketches, plans, etc., performed under the direction of the carpenter, the main items of repairs and improvements for the year were effected as usual by him and his assistants. These consisted of the entire carpenter work required under the special appropriations in connection with the new plumbing and tile floors at the girls' and main buildings; the four flights of iron stairways in the main building; lowering and enlarging the dormer windows in the upper floor of the south wing; reconstruction of portions of the roofs on the hospital and north wing; and the erection of a shed for the protection of tools, wagons, and farm machines at Fairmount. Other work was accomplished as follows: For the sloyd rooms ten bench hooks and racks with pigeonholes for blue prints were made, and in order to facilitate communication between the rooms two open doorways were cut through the intervening brick walls; at the Fairmount farm barn a pair of new doors were made and hung, new joists and a floor laid in the cow stable, and a partition put in the silo; new floors were laid in number nine dormitory, in number thirteen bathroom, in halls on third and fourth floors main building, and in officers' bathroom, girls' building; steel ceilings were put on in north hall, first floor, main building, and in the small day room at the south wing. There were also made one dump box for a farm wagon, four troughs, one wagon reach, one wagon bolster, one box for lumber wagon, eleven window screens, five bathroom cupboards, two wardrobes, one bookcase, one set folding steps, one plant stand, one hotbed box, four lockers, one bed screen, one medicine case, a skid for the storeroom, a stop fence on the ballground, a backstop for the tennis court, terrace steps for the hospital walk, and many other things of minor value and importance.

The painter and two boys whom he has trained to the work were all kept busy throughout the entire year; nearly all of the buildings received more or less of their attention, both exteriorly and interiorly, as well as the roofs; in fact, wherever such work seemed most needed. Several rooms also were repapered and many floors shellacked and varnished. Besides, two cutters, two carriages, and the family sleigh were carefully repainted, rubbed down and refinished.

At the close of the season last year the gardener and his assistants with a force of boys added a share to the year's improvements by widening the boys' ballground and reversing its grade. When this ballground was made for the boys, a few years ago, the grade was left towards the natural depression through the garden to the west of the girls' building and hospital. The ballground being such an extensive, hard, smooth surface, it was found that during heavy rains a large amount of water would quickly be turned off it and into the garden and overflowing the hospital roadway. Upon several occasions much damage was done to the garden and the roadway to the west of the hospital completely washed out. By the work effected last season, as above mentioned, the grade was reversed and the watershed turned into a ten-inch underground pipe at the southwest corner of the grounds for about one hundred feet, thence into the ravine through the woods and where no special damage can result. At the same time the earth removed in the grading was carried over at the eastern border of the ballground, giving it additional width of from ten to fifteen feet, which was much needed, and the pleasure of the boys at their games increased accordingly.

Without rain between the middle of April and the middle of June in this locality, the outlook for all farm and garden returns was extremely discouraging, especially for hay, corn, and potatoes, three chief items of our consumption. Fortunately, when the rain came it proved of such kind and quantity that the crops mentioned were revived beyond all expectation. When finally harvested they were found in excess of the average. A few garden products, as a result of the early drought and the cool summer which followed, did not mature well or were a total failure. The report of the full year's products of the farm and garden is given by the steward and will be found upon another page of this report. The item in this report which shows the most gratifying increase is that of milk, being an excess of 20,000 quarts over any previous year. The average daily number of cows at the farm supplying milk, for the past ten years, has been about thirty-five and the quantity has fluctuated from the lowest record in 1899 of 97,129 quarts to 159,680 in 1903. Our herd of cattle is Holstein, and by good care, careful breeding, and generous feeding has materially improved within the past few years. Milk is made use of to such an extent in the dietary of the institution that over four hundred quarts are daily required. Always before and until last April, to make up a deficiency milk was purchased outside; but since, the entire supply has been furnished by the institution herd.

In January last Mr. John L. Barnett, for ten years the honest, efficient and faithful steward, resigned the position to engage in a business enterprise in Syracuse, and in which his numerous friends at the institution vie with each other in wishing him the best of success. Upon the retirement of Mr. Barnett the appointment of Mr. W. B. Farrington was made from the eligible civil service list. The institution was fortunate in securing Mr. Farrington, whose previous experience in the State service at the Matteawan and Dannemora State hospitals had amply prepared him for the position of steward.

The institution was visited during the year by the following officials: By Prof. James A. Hamilton and Mr. Salem Hyde of Syracuse, members of the local committee of the State Charities Aid Association; by a committee of the board of supervisors of Erie county; by Mr. C. W. Winspear, superintendent of the Newark State Asylum; by Dr. John F. Fitz Gerald, superinintendent of the Rome State Asylum; by Prof. James A. Hamilton of Syracuse University and the class in sociology; by Dr. A. H. Beaton, superintendent of the Asylum for Imbeciles at Orillia, Ontario; by Dr. Charles Bernstein, acting superintendent of the Rome State Asylum; twice by the Hon. H. H. Bender, Fiscal Supervisor of the State Charitable Institutions; and three times by Dr. Stephen Smith, commissioner of the State Board of Charities.

Inspections of the buildings and premises have been made quarterly by the Rev. Dr. Robert W. Hill of the State Board of Charities, and monthly inspections by two or more members of the board of managers.

The institution was also opened to the public on thirty-four Friday afternoons of the school year. At the exercises given in the hall on these afternoons 2,277 persons appeared, or an average of sixty-seven for each day, and which is metioned as evidence of the public interest maintained in the work of the school.

Entertainments were provided the children upon forty-one different occasions, as follows: On October 21st a talk on the Indians by the Rev. Dr. Beauchamp; on November 5th a magical performance by Mr. Fred Hurd; on November 7th ventriloquism and a Punch and Judy show by Mr. Harry Bryant; on December 25th Christmas carols, tableaux and an operetta by teachers and pupils; on December 31st a stereopticon exhibition of Mt. Pelee in eruption by Mr. J. R. Powell; on February 16th a series of recitations by Miss Mildred Pipe; on February 22d patriotic exercises by teachers and pupils; on March 30th a concert by the Chaminade Club of Syracuse; on April 21st piano and violin recitations by the Misses Abbott of Ithaca; on June 8th a talk on the Filipinos by Prof. Clarence A. Perry; on June 19th a stereopticon exhibition by Mr. J. R. Powell; on July 4th a baseball game and a lawn festival in the afternoon and fireworks in the evening; on September 30th a musical trio by Mrs. William F. Belknap, Miss Ethel Lockwood, and Prof. Albert Kuenzlen of Syracuse. Other entertainments consisted of music and dancing in the hall on the various evenings during the months of December, January, February, and March.

The managers of the following periodicals have gratuitously sent to the institution their regular publications throughout the year and for which our thanks are publicly rendered: "The Washingtonian," Vancouver, Wash.; "Our Little People," Rochester, N. Y.; "The Optic," Little Rock, Ark.; "Development," Elwyn, Pa.; "The North Star," Faribault, Minn.; "The Charitable Observer," Lincoln, Ill.; "The City Mission Evangel," Brooklyn, N. Y.; and the "Bulletin of the Iowa State Institutions."

A highly appreciated gift received during the year was from Mrs. Mary M. Patton of Albany, N. Y., of a neatly framed engraved portrait of her father, the late Rev. Henry N. Pohlman, D.D., one of the members of the original board of trustees of this institution. Our thanks are also extended to many friends and parents of the pupils for generous gifts of toys, nuts, candies, money, etc., for use at the winter holiday season.

The purposes of this institution being educational in their character, children are admitted, according to the by-laws, only between the ages of seven and fourteen. As a result of the care and training given it is very rare that a child after admission does not in some little way improve; it may be simply in habits or disposition. There are, however, a few who prove to be practically unteachable; very many who improve moderately; quite a number materially; and a few again very decidedly. The training of the institution is on what may be considered moral, physical, intellectual and industrial lines. Besides being mentally defective the feeble-minded are many of them physically defective and morally askew. In order to show the benefits received and advances made in some cases from the training given on the lines mentioned we quote the following recent letters, one from a parent and three composed and written by pupils. These letters speak for themselves, and could be many times duplicated. The first is that of a boy, W. B., admitted November, 1896, age seven, now fourteen. Bad family history—father, mother, a brother and sister all feeble-minded. When admitted to the institution this boy knew the alphabet and could count to ten. The letter was written in a plain, legible hand of a childish character and without a misspelled word; the language and punctuation are his own.

Syracuse, N. Y.
Nov. 3, 1903.

My Dear Father,

I have not heard from you in a long time. And I know you will like to hear from me. I am getting along nicely in my school and in my sloyd. And I have played base-ball about all summer. And I have gathered lots of nuts this fall. I have lots of fun playing foot-ball with the boys. And I think C. [referring to his sister, also in the institution] is getting along nicely in school. And we are both well and hope you are the same. And we have had nice weather the last few days And one snow-fall. And I hope you will write soon, so good-bye to your loving son.

W. B.

The one which follows was addressed to the matron and was written by C. B., who was admitted in May, 1900, age seven, now ten. When admitted could neither read nor count. She went home to New York last summer during the vacation for the first time since admission. The letter was plainly and legibly written and is given verbatim et literatim:

July 8th, 1903.

My dear Miss W——, I hope this finds you well. I arrived safe home Mamma and Mrs. T——— was down to meet me as papa was working, had some supper was washed said my prayers huged my mamma and went to sleep. Mamma and papa was very pleased and surprised to find me so much improved I am haveing a good time I wish you could come and have a cup of tea with us please my love to all my kind teachers and attendance [meaning attendants] and little playmates Dr.C. and your dear self with love from mamma papa and little

Clara B.

The next letter was recently received from the father of one of our boys, M. B. H., who was admitted in September, 1894, age twelve, now twenty. When admitted could read words of one syllable and count to 100. For five years after admission was kept in the school; he then became restless and begged for outdoor employment with the gardener. During the five years in school he made good general progress, was in the fourth reader class and learned to read figures into thousands and could make small additions. Has always spent the vacation period at home and during last summer's vacation the letter which follows came unsolicited from the father:

Aug. 22, 1903.

H————ville.
———— Supt.

Dear Sir:

I have nothing but words of commendation for your splendid institution. M's development along all lines is all and more than I had hoped. I wish to have him return for another year. Is he eligible? Kindly advise, that I may get him in readiness.

I am Yours truly,
J. E. H.

The fourth letter and last is from a girl, E. R., who was admitted in March, 1889, age eight, now twenty-two. Her family history rather bad and a brother also feeble-minded. When admitted she could count to fifteen, but could not read at all. She was in the school for about ten years and advanced to the highest grade in reading. She also learned to sew nicely, crochet, and was useful at general housework. During her school years she was disposed to mean and petty annoyances and was at times sullen, stubborn, wilful, untruthful, and dishonest. As she grew to womanhood she became more and more reliable in every way, conscientious and anxious to do right. She came to feel that she could maintain herself in the world outside and her parents, brothers and sisters were persistent in requesting and demanding her removal. We thought as she did regarding her capabilities, but hesitated giving consent, fearing that her home surroundings were baneful, but upon the recommendation of the county superintendent of the poor she was permitted to go home last July on parole. Upon reaching home she very soon discovered that the home influences were degrading in the extreme. Her letter, which follows, is given to show the moral development and a strength of character sufficient to raise her above all family ties and escape the peril in which she unluckily found herself environed. We quote the letter in her own words:

H————ville, Nov. 1, 1903.

Doctor C———

Dear Sir:

Taking a few pleasant minutes of spare time I will write you a letter telling you as I have a good place to work getting from five to six dollars a week and boarding with the foreman's family at two dollars a week. I have decided not to come back there. I wrote and told Mrs. L. and will tell Mr. G. I am of age and am able to take care of myself. I go to church with the family and have joined a Sunday school. Mrs. L. writes me very nice letters and quite often. She told me she thought you'd like to hear from me. I have given up my people never to have anything more to do with them, nor they with me. I shall never go to W———— [where her parents reside] again. Good bye, Doctor, I should enjoy a letter from you very much.

Yours truly,

E. R.

It was mentioned in our last report that through the active efforts of one of your number and by means of a special appropriation the Swedish system of manual training known as sloyd had been introduced into the curriculum of the school. The system was undertaken as a matter of trial and experiment and has proved successful beyond our expectations. Three classes of ten boys each have been organized and each class is given from three to four hours' weekly instruction. The course of instruction was carefully planned after a methodically graded set of exercises on all models. An interesting feature of it is that the boy is required to prepare in advance a working drawing of the object he is going to make. With a drawing of his object in plain view before him, sloyd then demands a practical use of tools in the hands of the boy. The method, the design, the application, the construction each in its turn requires study on the part of the boy; each excites his interest and combined they prove to be all-around educators of great practical value. The teacher engaged in our work spent the entire summer at study in

Sweden and the course for the ensuing year will closely follow the advanced Swedish methods. We have added to our sloyd equipment blackboards, illustrations showing the different positions of the body required for various exercises, and a complete set of Swedish models.

At an exhibition of sloyd work given in one of the largest public schools of Syracuse last May, specimens of the work of the institution classes were contributed. Our part of the exhibit was very favorably commended by the visitors present, and it was generally conceded superior to that shown by some of the classes of normal children.

With renewed thanks to you, Mr. Chairman, and members of the board of managers, for your continued support and confidence, and with thanks also to the officers and employees for their hearty cooperation during the year's administration, I close my twentieth annual report in good cheer, with greater devotion to the purposes of the institution and a faith in the value of its work increasing as each year rolls on.

JAMES CARLTON CARSON,
Superintendent.

SYRACUSE, *December ninth,* 1903.

INVENTORY OF PROPERTY

AT THE

Syracuse State Institution for Feeble-Minded Children, 1903.

REQUIRED BY CHAPTER 413, LAWS OF 1897.

TRANSMITTED TO THE LEGISLATURE JANUARY 14, 1904.

INVENTORY.

SUPERINTENDENT'S HOUSE.

4 couches	$50 00
1 rattan settee	5 00
2 desks	20 00
6 upholstered chairs	100 00
3 cane chairs	12 00
1 office chair	5 00
9 rocking chairs	30 00
12 small chairs	20 00
3 kitchen chairs	3 00
2 kitchen tables	6 00
4 small tables	20 00
2 chiffoniers	25 00
4 washstands	18 00
1 center table	35 00
4 double beds	75 00
3 single beds	15 00
4 mattresses	60 00
3 single mattresses	18 00
1 hair pillow	1 00
6 feather pillows	7 50
4 box springs	25 00
2 single spiral springs	5 00
1 single woven wire spring	2 50

1 pair portiéres	$30 00
1 door curtain	3 00
3 pairs lace curtains	1 50
4 pairs curtains	12 00
10 pairs muslin curtains	15 00
2 tables	10 00
9 small rugs	30 00
4 carpet rugs	70 00
3 carpets	45 00
5 dressers	75 00
3 toilet sets	15 00
1 alarm clock	1 00
1 brass fire set	15 00
2 clocks	10 00
2 hampers	4 00
9 blankets	40 00
2 comforters	3 00
3 valances	6 00
8 dozen towels	9 60
8 Turkish towels	2 00
31 sheets	7 75
42 pillow cases	4 20
12 bedspreads	7 20
8 tablecloths	12 00
2 dozen doilies	3 50
1 dozen small doilies	50
4 fruit doilies	25
5 dozen napkins	6 00
3 carving cloths	75
2 flannel table covers	60

7 roller towels	$1 40
3 kitchen tablecloths	3 00
2 teacloths	4 00
5 yards matting	2 50
5 dishtowels	50
11 glasstowels	1 10
1½ dozen silver-plated forks	2 25
1 dozen silver-plated dessert spoons	1 56
½ dozen silver-plated teaspoons	60
¾ dozen silver-plated tablespoons	1 44
1 carver and fork	3 00
2½ dozen knives	1 50
1 dinner set, 95 pieces	18 00
20 breakfast dishes	2 00
6 trays	60
2 open dishes	20
2 breadplates	50
2 platters	80
1 dozen sauceplates	18
1 dozen glass sauceplates	18
1½ dozen fingerbowls	3 00
1½ dozen wineglasses	90
2 cruets	10
1 dozen glass cups	60
1 celery dish	25
14 tumblers	21
1 oyster soup set—tureen and 1 dozen plates	1 00
1 oatmeal set	75
7 glass dishes	70
1 cream and sugar set	50

2 salts and peppers	$0 10
1 dozen plates	60
1 dinner set, 43 pieces	30 00
1 fish boiler	50
1 steamer	60
1 ice cream freezer	2 50
1 coffeepot	2 00
1 eggbeater	05
1 iron spoon	10
2 wooden spoons	10
1 potato masher	05
1 chopping knife	10
2 preserve kettles	2 00
3 stone jars	90
1 pair scales	1 00
2 earthen pieplates	20
3 baking dishes	45
1 coffee mill	50
2 milkpails	60
3 jelly moulds	30
2 pudding moulds	20
2 oatmeal boilers	1 00
3 saucepans	1 50
1 dishpan	40
3 dippers	21
1 coffee canister	25
1 tea canister	25
1 salad bowl	25
2 breadplates	10
1 gempan	15

3	jugs	$0 60
2	baking dishes	40
5	caketins	25
3	breadtins	15
1	baking board	75
2	pans	30
2	sieves	20
3	graters	15
3	tin boxes	15
125	jelly glasses	3 75
210	fruit jars	6 10
1	breadknife	15
1	cakeknife	15
1	mixing bowl	25
3	flatirons	30
1	ironing board	1 00
2	cleaning pails	20
1	sloppail	50
3	wooden pails	30
1	washboard	20
1	washtub	50
3	dustpans	30
2	carpet sweepers	4 00

MAIN BUILDING—SUPERINTENDENT'S OFFICE.

	Office library, 400 volumes	$300 00
1	walnut case	3 00
3	leather-seated chairs	15 00
3	upholstered chairs	15 00
1	upholstered sofa	10 00

1 caneseated chair	$3 00
2 rugs	10 00
1 mirror	5 00
2 sofa pillows	1 00
2 black walnut desks	70 00
1 typewriter	40 00
1 revolving bookstand	10 00
1 letterpress and stand	7 50
1 picture	1 00
1 scale	5 00
1 dictionary rest and dictionary	5 00
1 scrap basket	50
1 basket	50
1 floorbrush	50
4 portraits	.....

RECEPTION ROOM.

5 leather-seated oak chairs	$25 00
4 cane-seated chairs	12 00
1 wicker chair	1 00
1 leather-seated couch	20 00
8 portraits	.....
Linoleum	25 00
1 atlas	5 00
1 directory	4 00
1 picture portfolio and easel	10 00
1 library table	3 00
1 floorbrush and dustbrush	65
1 musicbox	40 00

CENTER HALL.

8	cane-seated chairs	$20 00
2	walnut hatracks	5 00
2	wicker sofas	4 00
1	clock	50 00
2	doormats	1 50
	Linoleum	40 00
1	broom and dustpan	25
	Bust of Hon. John C. Spencer	.....

CENTER PORCH.

2	porch chairs	3 00
2	porch benches	4 00
2	lawn benches	5 00

HALL.

	Stair and hall carpet	18 00

FAMILY PARLOR AND SITTING ROOM.

	Children's library, 425 volumes	$106 25
1	library oak table	5 00
1	small oak table	2 50
1	mahogany table	15 00
1	imitation cherry table	5 00
1	scrapbasket	20
1	globe	5 00
19	pictures	19 00
3	wicker chairs	6 00
6	rockers	15 00

10 upholstered chairs	$25 00
1 mirror	10 00
1 shovel and tongs rest	1 00
1 poker	25
1 Brussels rug	2 50
Brussels carpet	50 00
4 curtain rods, wood	1 00
8 curtains	24 00
2 upholstered sofas	25 00
4 sofa pillows	1 00
1 marble clock	5 00
2 mantel ornaments	2 00
2 jardiniers	50

FAMILY DINING-ROOM.

1 lemon squeezer	10
1 salad dish	20
4 tablecloths	4 50
2 tablecloth, small	2 00
2 tablemats	1 00
3 dozen napkins	3 60
2 sideboard covers	1 00
2 Windsor shades	1 00
1 brass rod	10
5 pictures	....
1 breadknife	15
2 breadboxes	1 50
1 rollingpin	10
1 dozen hand towels	1 20
1 dozen glass towels	1 20

8 breadcloths	$0 80
1 knifebox	25
1 crackerbox	20
2 cakeboxes	30
1 sugarjar	40
1 carving set	3 00
1 colander	15
2 butterpats	20
1 soupladle	10
1 dozen nutpicks	1 25
1 cheesescoop	10
1 dozen tea knives, silver-plated	2 00
2 dozen dinner knives, silver-plated	4 56
2¾ dozen forks, silver-plated	5 50
1 refrigerator	10 00
1 icepick	5
2 water pails	50
1 dipper	10
1 sideboard	10 00
1 extension table	10 00
1 small table	3 00
15 chairs	30 00
1 teacaddy	10
1 butterjar	25
1 coffeepot	25
1 teapot	30
1 bushcloth	50
1 set of dishes, 318 pieces	25 00
4 jelly dishes	40
3 celery dishes	45

2	syrup cups	$0 20
20	tumblers	30
1	insect powder blower	08
2	vases	10
3	trays	45
1	teapot rest	10
11	tablespoons, silver-plated	1 76
1½	dozen soupspoons, silver-plated	2 38
4	dozen teaspoons, silver-plated	4 80
1	nutcracker	25
1	wire dish drainer	25
5	glass berry dishes	50
2	vinegar bottles	10
15	sherbet cups	75
6	lemonade glasses	12
1	table scraper and tray	31
2	spoonholders	20
6	pepper and salt shakers	60
1	broom	15
1	floorbrush	50
1	rug	5 00

CENTER DINING ROOM.

1	tray	20
20	dinnerknives, silver-plated	3 80
1	dozen teaknives, silver-plated	2 00
1 5-12	dozen teaspoons, silver-plated	1 70
1 2-12	dozen soupspoons, silver-plated	1 26
½	dozen tablespoons, silver-plated	96
2 2-12	dozen forks, silver-plated	3 25

1 table scraper and tray	$0 30
1 dozen glass towels	1 20
3 crochet tablemats	30
4 dozen napkins	4 80
1 set dishes, 296 pieces	75 00
½ dozen tumblers	09
13 fingerbowls	2 60
1 salad bowl	50
1 extension table	18 00
1 small table	8 00
9 cane-seated chairs	13 50
7 pictures	00
2 sideboard covers	1 00
1 vinegar bottle	05
1 syrup cup	10
1 teacaddy	10
1 soupladle	10
1 teapot	2 00
1 coffeepot	2 00
1 carving set	3 00
1 nutcracker	25
3 pepper and salt shakers	30
2 butterknives	50
1 sideboard	15 00
2 window shades	1 00
2 glass spoonholders	20
2 berry dishes	30
2 jelly dishes	30
2 plattercloths	20
2 linen center pieces	50

1 dozen doilies	$1 00
2 tablecloths, 3½ yards long	3 00
1 tablecloth, 4 yards long	1 75
4 tablecloths, 1 yard long	1 60
2 tablecloths, 2 yards long	1 60
2 hushcloths	50
2 brass rods	20
2 Brussels rugs	6 00

ATTENDANTS' DINING-ROOM.

3 dozen dishtowels	3 60
3 trays	45
6 traycloths	60
1 insect powder blower	08
6 tables	30 00
8 tablecloths, 4 yards long	14 00
8 tablecloths, 3½ yards long	12 00
4 tablecloths, 3 yards long	5 00
43 chairs	43 00
10 salt and pepper shakers	1 00
10 vinegar bottles	50
6 mustard pots	30
5 syrup cups	50
5 butterplates	50
7 glass spoonholders	70
3 vases	30
5 carving knives and forks	5 00
6 teapots	1 50
4 coffeepots	1 20
4 dozen tumblers	72

9 pitchers	$1 80
4 dozen plates, 9 inch	2 40
4 dozen plates, 7 inch	1 92
4 dozen soupplates	1 44
4 dozen saucedishes	72
5 dozen cups and saucers	2 40
4 dozen knives and forks	4 80
7 7-12 dozen teaspoons	4 55
1¼ dozen tablespoons	1 95
3 2-3 dozen dessertspoons	3 96
6 handtowels	60
1 refrigerator	9 00

CHILDREN'S DINING-ROOM.

5 tables, 3½-foot	7 50
2 tables, 7-foot	7 00
4 tables, 10-foot	20 00
8 tables, 12-foot	48 00
1 table, 15-foot	7 50
1 table, 20-foot	10 00
17½ dozen chairs	105 00
16 roller towels	3 20
½ dozen brooms	90
15½ dozen soupplates	5 58
16 dozen breakfast plates	9 60
15½ dozen teaplates	7 40
1 dozen dishpans	4 80
12½ dozen knives	7 50
15½ dozen forks	9 30
15½ dozen dessertspoons	16 74

15½ dozen mugs	$9 30
13½ dozen bowls	4 86
1½ dozen pitchers	3 60
12 sets salts and peppers	1 20
3 trays	45
5 syrup cups	50
14 dippers	1 40
1 syrup can	50
1 basket	25
35 dozen bibs	21 00
2½ dozen dishtowels	3 00
9 dishcloths	90
½ dozen teaspoons	30
6 dust brushes	90
6 dustpans	90
1 insect powder blower	8
1 mousetrap	5
8 pails	80

KITCHEN.

4 pine tables	4 00
12 wooden chairs	6 00
3 dozen pieplates	1 80
11 covered vegetable dishes	2 20
12 soup tureens	2 40
1½ dozen pans	2 70
½ dozen dishpans	2 40
½ dozen dripping pans	3 00
4 dippers	40
1 meatcleaver	1 00

1 meatchopper	$1 00
1 icecream freezer	2 50
3 milkcans	6 00
½ dozen mugs	30
1 1-6 dozen soupbowls	3 85
⅓ dozen colanders	60
1 cake griddle	40
3 cake turners	30
3 porcelain lined kettles	1 50
1 raisin seeder	1 00
2 dozen tin patepans	1 20
2 dozen iron patepans	1 50
3 teakettles	1 80
2 broilers	40
1 soup kettle	75
1 teacaddy	25
1 1-pint cup	05
1 1-quart cup	10
8 caketins	40
1 cakecutter	10
6 skimmers	30
2 granite kettles	1 50
1 breadcutter	2 00
1 breadcommode	4 00
1 slate pastry table	5 00
1 refrigerator	9 00
½ dozen pitchers	42
3 large platters	1 20
5 small platters	75
10 breadplates	50

1 dozen puddingtins	$0 60
6 puddingdishes	90
2 knifesteels	30
2 10-quart pails	30
4 1-gallon pails, galvanized	32
6 spiceboxes	60
½ dozen lunchbaskets	60
1 cracker box	20
3 sugar boxes	50
2 lemon squeezers	20
2 double boilers	1 20
1 double boiler coffeepot	1 00
2 pepper boxes	10
2 coffeepots	60
2 jelly moulds	20
2 dozen muffin rings	60
2 stewpans, iron	50
4 saucepans, galvanized	1 20
1 coffeebox	25
1 coffeemill	50
1 dishcommode	10 00
2 wire strainers	20
2 dozen paringknives	96
½ dozen carvingknives	1 50
3 forks, silver plated	50
3 dinnerknives	15
4 teaspoons, silver plated	40
1 dozen galvanized spoons	60
½ dozen dessertspoons, silver plated	78
3 meatcloths	15

3 breadcloths	$0 45
16 roller towels	3 20
1 dozen dishcloths	60
1½ dozen dishtowels	1 80
2 floursifters	10
1 creamery	40 00
3 potatomashers	15
4 eggbeaters	15
1 icepick	10
1 clock	2 00
1 rolling pin	10
3 choppingbowls and knives	1 95
4 mophandles	20
1 washboard	20
6 scrubpails and brushes	1 50
2 coalscuttles	60
1 stovepoker	10
1 insectpowder blower	08
2 brooms	30
1 dustpan	15
3 mousetraps	15
3 garbagecans	1 50

STOREROOM.

4 tables	6 00
2 pairs steps	1 00
8 step-ladders	8 00
1 broom, dust pan and brush	45
2 chairs	1 00
2 dozen candleholders	1 20

ATTENDANTS' SITTING ROOM.

2 tables	$3 00
1 upholstered couch	3 00
1 feather sofa pillow	25
2 rockers	1 50
1 broom, dust pan and brush	45
Linoleum	1 50
1 tablecover	25
6 chairs	4 50
1 mirror	40

HALLS AND BATHROOMS.

2½ dozen chairs	15 00
1 dozen step-ladders	12 00
1½ dozen scrubpails	1 80
1½ dozen scrubbrushes	90
2 insect powder blowers	16
3 dozen benches	36 00
1 dozen tables	12 00
4 mousetraps	20
1 rocker	1 50
10 dustcans	5 00
1 dozen brooms	1 80
10 dustpans	1 50
1 dozen dustbrushes	1 80
23 firepails	3 45
2 wallbrushes	1 00
4 floorbrushes	2 00
4 mirrors	4 00
½ dozen floorpolishers	30 00

SEWINGROOM.

3 pair steps	$1 50
6 clothesbaskets	1 50
1 pair shears	50
1 pair scissors	15
1 bench, 4 foot, veneer	6 00
3 sewingmachines	54 00
1 cane-seated chair	1 00
3 cane-seated rockers	3 00
1 broom and dustpan	25

BLANKETS, SHEETS, SPREADS AND PILLOW CASES IN CHILDREN'S ROOMS—MAIN BUILDING.

(The following list covers hospital room and rooms 2, 6, 8, 10, 11, 12, 13, 14, 16, 17, 22, 23, 20, 31, 41.)

316 blankets	$474 00
574 sheets	143 50
340 pillowcases	34 00
138 rollertowels	27 60
183 bedspreads	109 80
50 handtowels	5 00

HOSPITAL ROOM.

8 beds	$24 00
8 hair mattresses	40 00
4 rubber sheets	2 40
8 hair pillows	6 00
8 rockers	12 00
9 chairs	4 50
1 wardrobe	8 00

1 commode	$5 00
2 stands	2 00
1 washstand	5 00
1 table	1 00
1 whiskbroom	05
1 washbowl and pitcher	70
1 broom	15
1 dustpan	15
2 bureaus	16 00
1 dustbrush	15

FAMILY ROOMS.

17 tables	25 00
8 mirrors	8 00
16 cane-seated rockers	24 00
1 wicker rocker	2 00
2 clocks	1 00
1 inkstand	25
10 watercans	5 00
12 brooms	1 80
4 dustbrushes	60
1 medicine cabinet	2 00
48 sheets	12 00
48 pillowcovers	4 80
4 upholstered couches	28 00
2 wicker couches	6 00
10 washstands	50 00
2 feather dusters	50
5 brass rods	50
10 wardrobes	80 00

46	cane-seated chairs	$34 50
2	hospital chairs	10 00
12	rugs	12 00
4	writingdesks	20 00
2	black walnut bookcases	30 00
3	carpet sweepers	6 00
12	dustpans	1 80
3	chiffoniers	27 00
26	blankets	39 00
14	bedspreads	8 40
2	screens	6 00
2	floorbrushes	1 00
10	toiletsets	20 00
4	couchcovers	2 00
11	dressers	88 00
5	towelracks	1 25
10	foottubs	4 00
16	pictures	00
181	towels	18 10
1	door drape	1 00
7	pairs scrim curtains	1 75
4	pairs muslin curtains	1 00
16	pairs curtain rods	12 00
24	feather pillows	30 00
12	comfortables	18 00
1	dozen whiskbrooms	60
6	ingrain carpet	93 28
4	white curtains	5 00
3	mattings	12 00
2	mousetraps	10

6 double beds	$42 00
8 hair mattresses	72 00
1 waste paper basket	25
3 hampers	1 50
8 single beds	40 00
8 double beds	80 00

Room 2.

9 beds	36 00
1 comforter	1 50
9 mattresses—8 hair, 1 cotton	42 50
9 pillows—6 hair, 2 cotton, 1 feather	6 75
1 commode	5 00
1 washstand	5 00
2 tables	3 00
2 rockers	3 00
Wash bowl, pitcher and soapdish	1 00
1 broom, dust pan and brush	45
1 bureau	8 00
1 screen	1 00
7 chairs	3 50
1 waterpail	25
6 towels	60
1 whiskbroom	05
2 blankets	3 00

Room 3.

1 double bed	7 00
2 blankets	3 00
4 sheets	1 00

2 tables	$3 00
1 cotton pillow	50
1 feather pillow	1 25
4 pillowcases	40
1 hair mattress	9 00
1 comforter	1 50
1 spread	60
6 towels	60
1 chair	75
1 dresser	8 00
1 rocker	1 50
1 washstand	5 00
2 pitchers	1 00
1 toiletset	2 00
1 screen	1 00
1 broom	15
1 whiskbroom	05

Room 4.

1 single bed	4 00
1 hair mattress	5 00
1 bedspread	60
2 blankets	3 00
1 comforter	1 50
3 sheets	75
1 feather pillow	1 25
3 pillowcases	30
1 washstand	5 00
1 table	2 00
1 rocker	1 25

1 dresser	$8 00
6 towels	60
2 chairs	1 50
1 whiskbroom	05
1 pail	50
1 sloppail	50

Room 6.

12 beds	36 00
12 hair mattresses	60 00
6 rubber mattress covers	3 60
12 pillows	9 00
1 feather pillow	1 25
4 towels	40
1 bureau and cover	8 50
2 washstands	10 00
1 washstand cover	50
2 rockers	3 00
10 chairs	5 00
1 whiskbroom	05
1 floorbrush	50
1 dustpan and brush	30

Room 8.

10 beds	30 00
11 hair mattresses	55 00
4 rubber mattress covers	2 40
2 blankets	3 00
1 comforter	1 50
12 pillows	9 00

1	bureau and cover	$8 50
1	commode	5 00
1	looking glass	1 00
1	washstand	5 00
1	cover	60
	Washbowl, pitcher and soapdish	1 00
5	towels	50
1	rocker	1 50
11	chairs	5 50
1	screen	1 00
1	whiskbroom	05
1	pail	50
1	broom, dustpan and brush	45

Room 10.

10	beds	30 00
10	mattresses, 7 hair, 3 cotton	42 50
4	rubber mattress covers	2 40
2	blankets	3 00
1	comforter	1 50
10	hair pillows	7 50
1	feather pillow	1 25
1	bureau	8 00
1	lookingglass	1 00
1	washstand	5 00
	Washbowl, pitcher and soapdish	1 00
6	towels	60
2	tables	2 50
2	rockers	3 00
9	chairs	4 50

8 pitchers	$1 60
1 screen	2 00
1 whiskbroom	05
1 wooden pail	10
1 dustbrush	15
1 broom and dustpan	30

Room 11.

9 iron beds	36 00
9 cotton mattresses	22 50
9 pillows	6 75
1 bureau	8 00
8 chairs	4 00
1 broom, dustpan and brush	45
1 whiskbroom	05

Room 12.

10 beds	30 00
10 mattresses—3 cotton, 7 hair	42 50
11 pillows—3 cotton, 8 hair	7 50
2 rubber sheets	1 20
1 bureau	8 00
1 lookingglass	1 00
2 rockers	2 50
8 chairs	4 00
2 tables	2 50
6 towels	60
3 chambers	75
1 whiskbroom	05
1 broom, dustpan and brush	45

Room 13.

20 beds	$60 00
20 mattresses—11 cotton, 9 hair	72 50
10 rubber sheets	6 00
2 blankets	3 00
1 comforter	1 50
21 pillows—20 hair, 1 feather	16 25
1 bureau	8 00
1 commode	5 00
1 toilet set, 3 pieces	2 00
1 sloppail and watercan	1 00
2 chambers	50
2 rockers	2 50
19 chairs	9 50
2 tables	2 50
6 towels	60
1 screen	1 00
2 scrim sash curtains	50
1 whiskbroom	05
1 pail	50
2 brooms	30
1 dustpan	15
2 dustbrushes	30

Room 14.

11 beds	33 00
11 mattresses—8 cotton, 3 hair	35 00
12 pillows—6 hair, 4 cotton, 2 feather	9 00
1 comforter	1 50
1 bureau	8 00

1 washstand	$5 00
1 washbowl and pitcher	1 00
5 towels	50
1 sloppail	50
1 center table	2 00
2 rockers	2 50
11 chairs	5 50
1 whiskbroom	05
1 broom	15
1 dustpan and brush	30
1 wooden pail	10
1 waterpail	25
1 screen	1 00

Room 16.

11 beds	33 00
11 mattresses	27 50
8 rubber sheets	4 80
2 blankets	3 00
1 comforter	1 50
12 pillows—10 hair, 2 feather	10 00
1 bureau	8 00
1 washbowl, pitcher and soapdish	1 00
6 towels	60
2 chambers	50
11 chairs	5 50
1 screen	2 00
1 table	2 00
1 whiskbroom	05
1 broom	15

1 floorbrush	$0 50
1 dustpan and brush	30

Room 17.

9 beds	27 00
9 mattresses	22 50
1 rubber mattress sheet	60
10 pillows	7 50
1 bureau	8 00
1 lookingglass	1 00
1 rocker	1 25
8 chairs	4 00
1 table	2 00
1 broom, dustpan and brush	45
2 chambers	50

Room 21.

1 single bed	4 00
1 hair mattress	5 00
1 bedspread	60
2 blankets	3 00
1 comforter	1 50
3 sheets	75
2 feather pillows	2 50
4 pillowcases	40
1 mirror	1 00
1 toiletset	3 00
1 sloppail	50
1 whiskbroom	05
1 table	2 00

2 chairs	$1 50
2 rockers	2 50
5 towels	50
1 pail	50
1 broom, dustpan and brush	45

Room 22.

9 beds	27 00
9 mattresses—8 cotton, 1 hair	25 00
2 blankets	3 00
1 comforter	1 50
11 pillows—8 hair, 2 cotton, 1 feather	8 25
1 bureau	8 00
1 lookingglass	1 00
1 washstand	5 00
1 washbowl, pitcher and soapdish	1 00
2 chambers	50
1 rocker	1 25
7 chairs	3 50
1 screen	1 00
1 stand	2 00
1 whiskbroom	05
1 broom and dustpan	25
1 pail	50
6 towels	60

Room 23.

10 beds	30 00
10 mattresses—9 cotton, 1 hair	27 50
2 blankets	3 00

1 comforter	$1 50
11 pillows—8 hair, 2 cotton, 1 feather	8 25
1 bureau	8 00
1 lookingglass	1 00
1 screen	2 00
1 rocker	1 25
9 chairs	4 50
1 table	2 00
1 washstand	5 00
1 washbowl, pitcher and soapdish	1 00
6 towels	60
1 sloppail	50
1 whiskbroom	05
1 broom and dustpan	25
2 dust brushes	30
1 floorbrush	50

Room 20.

11 iron beds	44 00
11 mattresses—8 cotton, 3 hair	35 00
1 rubber mattress cover	60
11 pillows—8 hair, 3 cotton	7 50
1 bureau	8 00
1 lookingglass	1 00
2 rockers	2 50
9 chairs	4 50

Room 30.

1 three-quarter bed	4 00
1 hair mattress	8 00

1 blanket	$1 50
4 sheets	1 00
4 pillowcases	40
2 pillows	2 50
Carpet	2 00
1 dresser	8 00
1 table	2 00
1 table and cover	2 25
1 rocker	1 25
1 chair	50
6 towels	60
1 washstand	5 00
1 toiletset	2 00
1 waterpail	25
1 sloppail	50
1 whiskbroom	05
1 broom	15

Room 31.

29 beds	57 00
29 mattresses—28 hair, 1 cotton	142 50
2 blankets	3 00
1 comforter	1 50
28 rubber sheets	16 80
30 pillows	22 50
1 bureau and cover	8 50
1 lookingglass	1 00
1 table	2 00
1 washstand	5 00
Toiletset, 3 pieces	1 50

6 towels	$0 60
2 scrim sash curtains	50
1 screen	1 00
34 chairs	17 00
2 whiskbrooms	10
2 brooms	30
1 dustpan	10

Room 41.

15 beds	45 00
15 hair mattresses	75 00
2 blankets	3 00
1 comforter	1 50
15 hair pillows	11 25
1 feather pillow	1 25
1 bureau	8 00
1 lookingglass	1 00
1 table	2 00
1 screen	1 00
3 rockers	3 75
9 chairs	4 50
1 washstand	5 00
Toiletset, 3 pieces	1 00
6 towels	60
2 whiskbrooms	10
1 broom and dustpan	25

Room 24.

1 double bed	5 00
1 hair mattress	9 00

1 spread	$0 60
1 comforter	1 50
1 feather pillow	1 25
1 hair pillow	75
4 pillowcases	40
3 sheets	75
4 towels	40
1 washstand	5 00
Toiletset, 6 pieces	3 00
1 mirror	1 00
1 dresser	8 00
1 table	2 00
1 cane-seated chair	75
1 rug	40
1 small stand	1 00
4 chairs	2 00

NORTH SCHOOL ROOM.

1 bell	20
1 table	2 00
81 books	20 00
7 pictures	00
2 chairs	1 00

CENTER SCHOOL ROOM.

1 bookcase	10 00
10 pictures	00
Piano and stool	200 00
16 benches	24 00
1 table	3 00

1 clock	$5 00
4 chairs	2 00
1 bell	20
2 dozen books	8 40

CENTER HALL SUPPLY ROOM.

1 bench	4 50
3 commodes with school supplies	30 00
1 chartrack	1 50

SOUTH SCHOOL ROOM.

1 bookcase	5 00
1 table	2 00
1 mapcase	2 00
7 pictures	00
3 chairs	1 50
18 maps	30 00
1 clock	5 00
1 bell	20
24 books	4 80

WEST SCHOOL ROOM.

6 pictures	00
1 table	1 50
12 benches	24 00
3 chairs	1 50
2 bookcases and supplies	10 00
2 dozen books	8 40

SLOYD ROOM.

1 cabinet	$5 00
1 desk	5 00
2 chairs	1 00
Sloyd supplies	175 00

GYMNASIUM.

2 tables, 8-foot	8 00
Piano and stool	75 00
1 clock	5 00
8 settees, veneer, 6-foot	48 00
3 chairs	1 50

GIRLS' SITTING ROOM.

Piano and stool	50 00
9 settees, veneer—7, 7-foot, 2, 4-foot	75 00
2 tables, 6-foot	6 00
2 bookcases	10 00
4 chairs	2 00
11 pictures	00
1 clock	2 00
1 broom	15
1 jardinier	20

STOREROOM.

1 keyboard	25
1 desk	3 00
2 tables	4 00
3 chairs	1 50
1 fire axe	75

1 scrapbasket	$0 25
1 mirror	1 00
1 penrack	25
2 inkwells	20
Linoleum	1 00
1 pair steps	50
1 broom, dustpan and brush	45

NORTH WING.

Room 36.

1 bed	5 00
1 mattress	5 00
1 bedspread	60
1 pair blankets	1 50
4 sheets	1 00
2 pillows	2 50
4 pillowcases	40
1 bureau and cover	8 50
1 commode	5 00
1 washstand	5 00
Bowl, pitcher and soapdish	1 00
5 towels	50
1 standcover	50
1 table	2 00
3 chairs	1 50
Carpet	3 00

Room 37.

1 bed	4 00
1 hair mattress	9 00

1 bedspread	$0 60
2 blankets	3 00
4 sheets	1 00
1 feather pillow	1 25
1 hair pillow	75
2 pairs pillowcases	40
6 towels	60
1 dresser	8 00
1 table	2 00
1 tablecover	50
2 rockers	2 50
3 chairs	1 50
1 couch	7 00
1 comforter	1 50

Room 40.

2 feather pillows	2 50
4 pillowcases	40
1 blanket	1 50
3 sheets	75
9 towels	90
1 clock	50
Matting	1 00

Room 26.

32 beds	96 00
32 mattresses—20 cotton, 12 hair	110 00
12 rubber mattress covers	7 20
33 bedspreads	19 80
54 blankets	81 00

96	sheets	$24 00
32	pillows—22 hair, 10 cotton	21 50
1	feather pillow	1 25
64	pillowcases	6 40
1	washstand	5 00
	Toiletset, 3 pieces	1 00
45	roller towels	9 00
1	dresser	8 00
1	table	3 00
2	stands	2 00
35	chairs	17 50
2	rocking chairs	2 50
6	benches	6 00
5	brooms	75
4	dustbrushes	60
2	stepladders	2 00

BATHROOM.

1	bureau	8 00
1	looking glass	1 00
1	towel rack	50
1	soap dish	05
1	water can	50
2	pails	20
1	foot tub	40
2	chairs	1 00
1	broom	15

HALL.

Dust can	50
Broom and dustpan	25

SOUTH WING—DORMITORY.

47 beds	$141 00
48 hair mattresses	240 00
1 dozen rubber mattress covers	7 20
50 spreads	30 00
66 blankets (38 "Indestructible")	99 00
96 sheets	24 00
40 hair pillows	30 00
84 pillowcases	8 40
50 roller towels	10 00
36 chairs	18 00
1 starchcan	20
½ dozen whiskbrooms	30
½ dozen dustbrushes	90
6 brooms	90
2 dustpans	20
4 insect powder blowers	32
2 mousetraps	10

HALLS.

3 dustcans	3 00
3 dustpans	30
3 brooms	45
6 commodes	30 00
3 clocks	9 00
6 step-ladders	6 00

SCHOOLROOM, BATHROOMS AND PIAZZA.

3 pails	30
25 benches	25 00

1	commode	$5 00
1	table	2 00
10	pictures	00
1	musicbox	15 00

CHILDREN'S SITTING ROOM.

6	chairs	3 00
1	commode	5 00
1	couch	7 00
1	lookingglass	1 00
1	rocker	1 00
1	broom	15

CHILDREN'S DINING-ROOM.

7	tables, 12-foot	21 00
4	dozen chairs	24 00
3½	dozen plates	2 10
4	dozen soupplates	1 44
1½	dozen dessert plates, 7-inch	72
3½	dozen bowls	1 26
3½	dozen mugs	2 10
4	pitchers, 4-quart	80
2	cooking kettles	2 00
1	breadcutter	2 00
1	breadbox	75
3	salts and peppers	80
1	platter	40
3	jars, stone	60

1 cooking spoon	$0 25
3½ dozen spoons	2 10
2⅔ dozen forks	1 60
½ dozen knives	30
42 table bibs	2 10
1 dozen dishtowels	1 20
6 towels, roller	1 20
2 sugar boxes	40
3 agate pails	1 50
1 syrupcan	50
2 dishpans	80
1 vinegar bottle	05
2 scrubpails	20
1 washboard	20
1 dustbrush	15
1 broom	15
1 dustpan	15
1 floorbrush	2 50

SEWING ROOM.

3 sewingmachines	54 00
1 cutting table	1 00
4 pairs scissors	1 00
1 pair buttonhole scissors	60
3 chairs	75
1 dozen baskets	9 00
1 lapboard	1 00
2 window shades	1 00
2 flatirons	50
1 flatiron rest	10

1 tracer	$0 25
3 rockers	3 00
1 mirror	1 00
1 dustpan and brush	25
1 broom	15
6 towels	60

Room 1.

1 double bed	5 00
1 hair mattress	9 00
1 bedspread	60
2 pairs blankets	3 00
1 comforter	1 50
4 sheets	1 00
2 feather pillows	2 50
4 pillowcases	40
1 dresser	8 00
1 washstand	5 00
1 toiletset, 6 pieces	3 00
1 chamber pail	50
6 towels	60
1 couch	7 00
1 wardrobe	8 00
1 picture	00
1 clock	2 00
2 pair scrim curtains	1 00
3 rockers	3 00
1 upholstered chair	3 00
3 cane-seated chairs	2 25

1 table and spread	$5 00
1 medicine chest	2 00
1 foottub and watercan	50
1 whiskbroom	05
1 broom	25
Matting	1 50
3 rugs	1 50

Room 2.

1 double bed	5 00
1 cotton mattress	4 00
1 spread	60
2 pair blankets	3 00
1 comforter	1 50
3 sheets	75
2 pillows—1 hair, 1 feather	2 00
4 pillowcases	40
1 dresser	8 00
1 dresser cover	25
1 washstand	5 00
1 towelrack	25
4 towels	40
1 toiletset, 4 pieces	2 00
1 chamber pail	50
3 chairs	1 50
2 windowshades	1 00
1 whiskbroom	05
1 broom	15
1 dustpan and brush	30

Room 3.

1 single bed	$4 00
1 cotton mattress	2 00
1 spread	60
2 blankets	3 00
1 comforter	1 50
2 pillows	2 00
4 pillowcases	40
3 sheets	75
1 bureau	8 00
2 bureau covers	50
2 windowshades	1 00
1 rocker	1 50
1 table	2 00
2 chairs	1 00
1 stand	2 00
1 toiletset, 4 pieces	2 00
3 towels	30
1 pail	10
1 whiskbroom	05
1 broom	15
1 dustpan and brush	30

Room 4.

1 double bed	7 00
1 hair mattress	9 00
1 spread	60
2 blankets	3 00
1 comforter	1 50

3 sheets	$0 75
2 feather pillows	2 50
4 pillowcases	40
1 washstand	5 00
1 washbowl and pitcher	60
4 towels	40
1 dresser	8 00
2 dresser covers	50
1 table	1 50
1 table spread	50
2 rocking chairs	3 00
3 chairs	1 50
2 windowshades	1 00
2 pails	50
1 whiskbroom	05
1 broom, dustpan and brush	45

Room 5.

2 double beds	14 00
2 mattresses—1 cotton, 1 hair	7 50
2 spreads	1 20
4 blankets	6 00
2 comforters	3 00
6 sheets	1 50
4 pillows—2 hair, 2 feather	4 00
4 pillowcases	40
2 dressers	16 00
2 tables	3 00
3 windowshades	1 50

1 toiletset, 3 pieces	$1 50
12 towels	1 20
2 chairs	1 00
2 pails	1 00
1 whiskbroom	05
1 broom	15
1 dustpan and brush	30

Room 6.

1 three-quarter bed	4 00
1 mattress	8 00
1 spread	60
2 blankets	3 00
1 comforter	1 50
4 sheets	1 00
2 pillows—1 feather, 1 cotton	2 00
4 pillowcases	40
6 towels	60
1 dresser and cover	8 50
1 washbowl and pitcher	1 00
2 tables	3 00
2 rockers	3 00
3 chairs	2 25
1 dustpan and brush	30
1 broom	15

Room 7.

2 single beds	8 00
2 cotton mattresses	5 00

2 bedspreads	$1 20
4 blankets	6 00
2 comforters	3 00
6 sheets	1 50
4 pillows—2 cotton, 2 feather	4 00
8 pillowcases	80
7 towels	70
2 dressers and covers	17 00
1 toiletset, 3 pieces	1 50
1 stand and cover	1 50
2 windowshades	1 00
2 rockers	2 50
2 chairs	1 50
2 pails	1 00
1 whiskbroom	05
1 broom, dustpan and brush	45

Room 8.

2 single beds	8 00
2 cotton mattresses	5 00
2 spreads	1 20
4 blankets	6 00
2 comforters	3 00
6 sheets	1 50
4 pillows—2 cotton, 2 feather	4 00
8 pillowcases	80
5 towels	50
3 windowshades	1 50
1 washstand	5 00

1 toiletset	$2 00
2 pails	1 00
1 dresser	8 00
4 chairs	2 00
1 stand and cover	1 50
1 whiskbroom	05
1 broom, dustpan and brush	45

Room 9.

1 double bed	9 00
1 cotton mattress	2 50
1 bedspread	60
2 blankets	3 00
2 comforters	3 00
4 sheets	40
2 feather pillows	2 50
4 pillowcases	40
1 washstand	5 00
1 toiletset	2 00
1 foottub	40
7 towels	70
1 dresser	8 00
1 table	1 25
3 rockingchairs	3 75
3 chairs	2 25
1 whiskbroom	05
1 broom, dustpan and brush	45

Room 10.

1 single bed	4 00
1 cotton mattress	2 50

1 spread	$0 60
2 blankets	3 00
1 comforter	1 50
4 sheets	1 00
2 pillows—1 hair, 1 cotton	2 00
4 pillowcases	40
6 towels	60
1 washbowl and pitcher	1 00
1 dresser	8 00
2 dresser covers	1 00
2 windowshades	1 00
1 rocker	1 25
2 chairs	50
1 table	1 25
1 whiskbroom	05
1 pail, dustpan and broom	45

Room 43.

1 double bed	9 00
1 hair mattress	9 00
1 spread	60
2 blankets	3 00
1 comforter	1 50
3 sheets	75
3 pillows—1 hair, 2 feather	3 25
4 pillowcases	40
1 washstand	5 00
1 washbowl and pitcher	1 00
4 towels	40

1 chiffonier	$9 00
1 lookingglass	1 00
1 wardrobe	8 00
3 rockers	3 75
1 chair	50
2 center tables	2 00
Matting	1 50
1 rug	25

Room 45.

1 double bed	7 00
1 cotton mattress	5 00
1 bedspread	60
3 blankets	4 50
1 comforter	1 50
3 sheets	75
2 feather pillows	2 50
4 pillowcases	40
1 washstand	5 00
2 stand covers	50
1 toiletset, 3 pieces	1 50
6 towels	60
1 bureau	8 00
1 mirror	1 00
1 windowshade	50
1 center table	1 00
2 rockers	2 50
2 chairs	1 00
1 sloppail	50

2 scrubpails	$0 20
Linoleum	3 00

Room 46.

1 double bed	7 00
1 hair mattress	9 00
1 bedspread	60
2 blankets	3 00
1 comforter	1 50
3 sheets	75
2 pillows—1 hair, 1 feather	2 00
4 pillowcases	40
1 washstand	5 00
1 toiletset, 4 pieces	2 00
1 sloppail	50
6 towels	60
2 windowshades	1 00
1 dresser	8 00
2 cane rockers	3 00
2 rugs	1 50
1 whiskbroom	05
1 broom and dustpan	30

Room 47.

Carpet	3 00
1 bureau	8 00
1 table	1 50
1 washstand	5 00
4 pillowcases	40

6 towels	$0 60
2 blankets	3 00
4 sheets	1 00
2 windowshades	1 00
1 rocking chair	1 50
1 splint chair	1 00
1 whiskbroom	05
1 watercan	50
1 slopcan	50
1 broom and dustpan	30

Room 48.

1 double bed	7 00
1 mattress	9 00
1 spread	60
2 blankets	3 00
1 comforter	1 50
4 sheets	40
2 feather pillows	2 50
4 pillowcases	40
1 washstand	5 00
1 toiletset, 4 pieces	2 00
5 towels	50
1 watercan	50
2 bureaus	16 00
2 mirrors	2 00
2 rocking chairs	2 50
2 chairs	1 00
1 windowshade	50

Room 49.

1 double bed	$7 00
1 mattress	9 00
1 spread	60
2 blankets	3 00
1 comforter	1 50
4 sheets	40
2 feather pillows	2 50
4 pillowcases	40
1 washstand	5 00
1 splasher	50
1 stand cover	50
1 toiletset, 4 pieces	2 00
1 water pail and can	1 00
1 sloppail	50
7 towels	70
1 bureau	8 00
1 bureau cover	50
2 mirrors	2 00
1 picture	00
1 center table	2 00
2 rocking chairs	2 50
1 chair	50
1 whiskbroom	05
1 window curtain	50

Room 73.

1 single bed	4 00
1 hair mattress	5 00

1 comforter	$1 50
3 blankets	4 50
3 sheets	75
2 pillows—1 hair, 1 feather	2 00
4 pillowcases	40
1 washstand	5 00
1 lookingglass	1 00
1 toiletset, 3 pieces	1 50
1 watercan	50
1 sloppail	50
6 towels	60
2 rockers	2 50
1 chair	50
1 foottub	40
1 table	1 50

MUSIC HALL BUILDING—HALL AND MUSIC ROOM.

34 pairs dumbbells	3 40
28 pairs Indian clubs	5 60
24 pairs rings	4 80
36 wands	72
16 heavy poles	1 60
225 chairs	112 50
100 folding chairs	50 00
Piano and stool	400 00
3 commodes	15 00
3 tables	15 00
5 pictures	00
1 bell	20

1 triangle	$0 75
3 bass horns	30 00
1 music chart	5 00
4 violins	25 00
1 double bass	20 00
1 flute	15 00
2 cornets	20 00
2 sets cymbals	2 00
3 alto horns	30 00
1 violincello	10 00
2 claironets	25 00
1 piccolo	12 00
1 bass drum	10 00
1 snare drum	10 00
4 tenor horns	40 00
2 trombones	20 00
10 musicracks	7 50
1 chartrack	75
5 blackboards and 6 stands	4 00
1 clock	5 00
3 firepails	45
Broom, dustpan and brush	45

GIRLS' SEWING ROOM.

8 sewingmachines	144 00
4 settees, veneer, 4-foot	24 00
5 pictures	00
2 lapboards	40
19 chairs	9 50

4	tables, 6-foot	$12 00
1	commode	10 00
1	lookingglass	1 00
7	shears	2 10
1	wastebasket	15

KNITTING ROOM.

8	settees, veneer—5, 6-foot; 3, 4-foot	63 00
	Lapboard	1 20
1	screen	1 00
4	knitting machines and table	40 00
1	clothesbasket	25
1	wastebasket	20
8	shears	2 40
1	lookingglass	1 00
2	tables	6 00

KINDERGARTEN ROOM.

	Piano and stool	150 00
9	settees, veneer—6, 6-foot; 3, 4-foot	72 00
2	tables	6 00
6	chairs	3 00
6	pictures	00
2	commodes with school supplies	10 00
	Dustbrush and broom	25

BOYS' SEWING ROOM.

5	tables—3, 6-foot; 1, 4-foot; 1, cutting	12 00
15	settees, veneer—14, 4-foot; 1, 6-foot	91 00

1 puzzle-sawing machine	$3 00
3 sewingmachines	54 00
6 chairs	3 00
4 pictures	00
2 matboards	1 00
2 pairs shears	70
3 pairs scissors	60
1 pair buttonhole scissors	40

TAILOR SHOP.

5 sewingmachines	90 00
3 settees, veneer—2, 4-foot; 1, 6-foot	21 00
1 commode	5 00
1 mirror	50
9 chairs	4 50
4 tables—3, 6-foot; 1, 3½-foot	10 75
5 pictures	00
2 baskets	50
1 jardiniere	50
2 pair tailor shears	2 50
5 pair shears	1 25
2 pair buttonhole shears	1 00
1 ironing board	50
4 flatirons	80
2 pressboards	20

HALL.

1 clock	5 00
1 dustcan	50

STOREROOMS.

1 cupboard	$3 00
6 tables	15 00
1 desk	2 00
1 safe	50
6 chairs	3 00
2 benches	1 00
1 barrel truck	4 00
6 barrel truck frames	7 50
2 scales	35 00
3 steps	75
2 waste paper baskets	50
1 cheesesafe	15
20 biscuitboxes	2 00
2 agate measures	50
1 hatchet	50
4 butterknives	80
5 teacanisters	75
4 spiceboxes	40
2 buttertryers	30
2 baskets	1 10
20 scoops	2 50
1 funnel	15
1 hammer	10
1 nailpuller	50
1 dirtcan	50
1 broom	30
2 dustbrushes	30

SHOEROOM.

1	step	$0 25
1	table	1 50
1	chair	50

HOSPITAL—WARDS.

34	single beds	136 00
34	mattresses	85 00
18	cotton mattress covers	4 50
20	rubber mattress covers	12 00
34	spreads	20 40
38	blankets	57 00
110	sheets	27 50
40	pillows	30 00
70	pillowcases	7 00
8	roller towels	1 60
38	handtowels	3 80
6	center tables	6 00
27	pictures	00
16	chairs	8 00
17	rocking chairs	17 00

BATHROOMS.

4	pails and scrubbrushes	1 00
4	brooms, dust pans and brushes	45
3	floorbrushes	1 50
4	mops	20
1	dustcan	1 00

4 handbasins	$0 40
2 foottubs	80
3 commodes	15 00
1 sloppail	50

HALLS.

1 willow couch	2 00
1 dustcan	1 00
7 pictures	00
2 center tables	3 00
1 piano and stool	100 00
1 clock	3 00
3 chairs	1 50

NURSES' ROOMS.

1 picture	00
4 single beds	16 00
4 mattresses	20 00
7 spreads	4 20
7 blankets	10 50
16 sheets	4 00
8 pillows	6 00
16 pillowcases	1 60
16 towels	1 60
4 washstands	20 00
4 washbowls, pitchers and soapdishes	4 00
3 slopjars	2 10
2 carpetrugs	2 00

1 willow couch	$1 00
1 couch	7 00
1 sewing machine	18 00
4 dressers	32 00
6 chairs	4 50
9 rocking chairs	11 25
7 center tables	10 50

PRIVATE ROOMS.

1 crib	3 00
7 beds	28 00
8 mattresses	40 00
4 blankets	6 00
10 sheets	2 50
8 pillows	6 00
8 pillowcases	80
8 handtowels	80
4 commodes	20 00
1 washbowl and pitcher	1 00
1 dresser	8 00
3 stands	4 50
6 pictures	00

GIRLS' ROOMS.

2 single beds	8 00
2 mattresses	10 00
2 spreads	1 20
4 blankets	6 00
8 sheets	2 00

4 pillows, 2 feather	$4 00
8 pillowcases	80
1 stand	2 00
1 washbowl	50
6 towels	60
1 dresser	8 00
1 chair	50
2 rockers	2 50

OPERATING ROOM.

2 operating tables	26 00
1 vapor bath box	5 00
1 medicine case	15 00
1 disinfecting apparatus	5 00
1 sterilizer	8 00
1 Kelly pad	3 00

NURSES' DINING-ROOM.

1 table	5 00
6 chairs	4 50
1 stand	1 00
6 glasses	09
Dishes, 59 pieces	8 00
4 tablecloths	4 00
1 dozen napkins	1 20
1 crumbtray	15
12 knives and forks	2 25
1 dozen spoons	1 20
3 pitchers	60
2 salts and peppers	10

CHILDREN'S DINING-ROOM.

4 tables—2, 10-foot; 1, 6-foot; 1, 8-foot	$17 00
28 chairs	21 00
1 creamery	23 76
18 soupplates	54
12 sauceplates	18
24 mugs	1 20
7 bowls	21
3 salts and peppers	10
26 plates	1 30
3 pitchers	60
10 knives and forks	1 00
28 spoons	1 40
12 trays	1 20
2 pictures	00

KITCHEN.

2 tables, 4-foot	4 00
1 refrigerator	8 00
1 breadcan	50
1 breadbox	75
1 dipper	10
3 large spoons	30
2 eggbeaters	10
1 griddle	40
1 chopping bowl and knife	65
2 gempans	30
2 drippingpans	80
2 sets caketins	40

3 fryingpans	$0 75
2 dishpans	80
2 strainers	10
1 granite kettle	60
1 iron kettle	50
2 teakettles	1 00
2 teapots	25
2 coffeepots	60
1 toaster	15
2 puddingdishes	30
1 rollingpin	10
1 steamer	60
1 coffeegrinder	50
1 breadcutter	2 00
6 pietins	30
1 potatomasher	10
1 sugarcan	25
3 basins	30
1 clock	2 00
5 chairs	2 50
6 dishtowels	60
4 rollertowels	80
1 washboard	20
1 small coalshovel	10
2 coalbuckets	1 20
1 dustpan and brush	25
1 dustbrush	15
1 pail and scrubbrush	25
1 garbagecan	50

CELLAR.

10	jellybowls	$0 60
15	jellyglasses	25
160	fruitcans	4 80
6	jars	1 20

ATTIC.

1	bed	4 00
1	mattress	2 50
2	pillows	1 50
2	stands	3 00
4	chairs	2 00
1	washbowl and pitcher	1 00

DISPENSARY.

21	chairs	10 50
1	surgical chair	4 00
1	desk chair	3 00
1	desk	5 00
1	mirror	50
1	stand	25
	Steps	25
1	chiffonier	9 00
1	washstand	5 00
1	towelrack	50
45	towels	4 50
1	foottub	.50
1	small table	1 00

8	pictures	$0 00
2	inkstands	25
52	books, medical	30 00
1	microscope	50 00
2	medicine cases	8 00
1	Fairbanks scale	20 00
1	physical exerciser	5 00
1	dental engine	30 00
1	air condenser	10 00
1	electric battery	5 00
	Broom, dustpan and brush	45

GIRLS' BUILDING—SITTING ROOM—FAMILY.

Ingrain carpet	4 00
Small rug	50
Center table	2 00
Rocker, upholstered	2 50
Chair, haircloth	3 50
Willow couch	1 00

ROOM A—FAMILY.

1	bed	5 00
1	mattress	9 00
1	spread	60
2	blankets	3 00
4	sheets	1 00
2	pillows, feather	2 50
6	pillowcases	60

6 towels	$0 60
1 washstand	5 00
Toiletset	2 00
Dresser	8 00
Ingrain carpet	4 00

ROOM B—FAMILY.

1 folding bed	10 00
1 mattress	9 00
1 spread	60
2 blankets	3 00
4 sheets	1 00
2 pillows, feather	2 50
6 pillowcases	60
8 towels	80
Small table	1 00
1 upholstered couch	5 00
1 upholstered rocker	2 00
1 cane-seated rocker	75
1 splint rocker	1 00
1 haircloth chair	2 50
1 electric lamp	3 00
1 Brussels rug	19 00

CENTER HALL.

1 splint chair	75
2 cane-seated chairs	2 00
1 bookcase	10 00

1 chiffonier	$8 00
2 keyracks	20
1 small table	1 50

ROOM C.

1 double bed	7 00
1 mattress, hair	9 00
1 spread	60
2 blankets	3 00
4 sheets	1 00
2 pillows, feather	2 50
6 pillowcases	60
6 towels	60
1 washstand	5 00
1 toiletset	2 00
1 pair sash curtains	25
1 small stand	1 00
1 splint rocker	1 25
1 willow rocker	1 00
2 cane-seated chairs	1 50
1 dresser	8 00
Ingrain carpet	3 00

ROOM D.

1 double bed	7 00
1 mattress, hair	9 00
2 spreads	1 20
2 blankets	3 00

4 sheets	$1 00
2 pillows, feather	2 50
6 pillowcases	60
6 towels	60
1 washstand	5 00
1 toiletset	1 50
1 pair sash curtains	25
1 picture	00
2 rockers	2 50
1 cane-seated chair	75
1 small stand	1 00
1 dresser	8 00
2 breadths ingrain carpet	1 50

ROOM E.

2 iron beds, single	8 00
2 mattresses, hair	10 00
2 spreads	1 20
6 blankets	9 00
8 sheets	2 00
2 pillows, feather	2 50
8 pillowcases	60
12 towels	1 20
2 washstands	10 00
2 toiletsets	4 00
2 mirrors	2 00
3 rockers	3 75
4 splint chairs	3 00
1 wardrobe	8 00

1 small stand	$1 00
2 dressers	16 00
1 upholstered couch	6 00

ROOM F.

14 beds	42 00
14 mattresses, cotton	35 00
14 pillows	10 50
1 dresser	8 00
1 washstand	5 00
1 bowl and pitcher	1 00
1 sloppail	50
2 screens	1 50
1 rocker	1 25
1 splint chair	75
14 wooden chairs	7 00

ROOM G.

15 beds	45 00
15 mattresses, cotton	37 50
15 pillows	11 25
1 dresser	8 00
1 washstand	5 00
1 bowl and pitcher	1 00
1 sloppail	50
1 rocker	1 25
1 splint chair	75
14 wooden chairs	7 00
2 screens	1 50

ROOM H.

23 beds	$69 00
23 mattresses, cotton	57 50
23 pillows	17 25
2 dressers	16 00
1 washstand	5 00
1 bowl and pitcher	1 00
1 sloppail	50
1 rocker	1 25
1 splint chair	75
23 wooden chairs	11 50
2 screens	1 50

ROOM I.

15 beds	45 00
15 mattresses, cotton	37 50
15 pillows	11 25
1 dresser	8 00
1 washstand	5 00
1 bowl and pitcher	1 00
1 sloppail	50
1 rocker	1 25
1 splint chair	75
2 screens	1 50
14 wooden chairs	7 00

ROOM J.

14	beds	$42 00
14	mattresses, cotton	35 00
14	pillows	10 50
1	dresser	8 00
1	washstand	5 00
1	bowl and pitcher	1 00
1	sloppail	50
2	screens	1 50
1	small stand	1 00
1	machine	18 00
1	rocker	1 25
16	wooden chairs	8 00
1	commode	5 00
1	small bureau	6 00

ROOM K.

25	beds	75 00
25	mattresses, cotton	62 50
25	pillows	18 75
1	dresser	8 00
1	washstand	5 00
1	bowl and pitcher	1 00
1	sloppail	50
1	rocker	1 25
1	splint chair	75
24	wooden chairs	12 00
2	screens	1 50

SHEETS, PILLOWCASES, BLANKETS, SPREADS AND TOWELS IN CHILDREN'S ROOMS F, G, H, I, J, K.

324 sheets	$81 00
11 rubber sheets	6 60
204 pillowcases	20 40
177 blankets	165 50
75 spreads	45 00
130 towels, roller	26 00
136 towels, hand	13 60

SEWING ROOM.

1 thermometer	10
2 tables, 14-foot	14 00
1 cutting table, 6-foot	3 00
5 sewingmachines	90 00
1 clock	3 00
47 wooden chairs	23 50
11 rockers	11 00
1 piano and stool	50 00
6 pictures	00

IRONING ROOM.

3 pictures	00
31 flatirons	3 10
16 ironing tables	24 00
1 small table	1 00
20 wooden chairs	10 00
2 rockers	1 50

1 mirror	$0 25
1 bookcase	8 00

WEST SCHOOL ROOMS.

2 tables, 12-foot	12 00
2 small tables	4 00
60 wooden chairs	30 00
2 rockers	2 00
Pictures	00
Mirror	50
1 clock	3 00
1 piano and stool	40 00
1 commode	8 00
2 thermometers	20

ATTIC.

1 bed	3 00
3 mattresses	7 50
11 pillows	8 25
2 rubber sheets	1 20
3 commodes	15 00
2 chests	2 00

CLOSETS AND BATHROOMS.

4 wooden chairs	2 00
4 cupboards	6 00
8 stepladders	8 00

FAMILY DINING-ROOM.

1	extension table	$9 00
1	small table	2 00
6	chairs	6 00
4	tablecloths, 3 yards each	6 00
11	teaspoons, silver-plated	1 10
6	dessertpoons, silver-plated	78
5	tablespoons, silver-plated	80
12	forks, silver-plated	1 50
11	dinnerknives. silver plated	1 15
8	teaknives	80
1	carving knife and fork	3 00
12	dinnerplates	60
9	teaplates	36
10	soupplates	30
2	cakeplates	20
8	individual butterplates	08
1	butterdish	15
3	platters	1 20
3	vegetable dishes	30
	Soup tureen and ladle	40
1	cakedish	10
6	coffeecups, 12 saucers	36
7	teacups, 10 saucers	34
10	saucedishes	15
1	gravy boat and tray	25
1	teapot	25
1	coffeepot	30
12	salts and peppers	1 20

18	tumblers	$0 27
2	vinegar cruets	05
1	crumbtray	15
1	large server	50
1	small tray	15
1	bell	20

ATTENDANTS' TABLE.

1	extension table	8 00
8	chairs	6 00
5	tablecloths, 3-yard	7 50
1	tablepad	50
3	colored tablecloths	2 25
27	teaspoons, silver-plated	2 80
7	dessertspoons, silver-plated	91
4	tablespoons, silver-plated	64
8	forks, silver-plated	1 00
9	knives, silver-plated	90
1	knifebox	20
1	carving knife and fork	3 00
21	dinnerplates	1 05
14	dessertplates	56
12	soupplates	36
1	breadplate	10
10	individual butterplates	10
4	vegetable dishes	60
1	soup tureen and ladle	40
14	cups	42
34	saucers	1 02

19	saucedishes	$0 30
4	individual vegetable dishes	20
23	tumblers	35
1	waterpitcher	20
16	salts and peppers	1 60
1	sugarbowl	10
1	mustarddish	05
3	small pitchers	15
1	vinegar cruet	05
1	crumbtray and brush	25
1	coffeepot	30
1	teapot and stand	30
1	gravyboat	15

CHILDREN'S DINING-ROOM.

8	tables—7, 14-foot; 1, 12-foot	55 00
95	chairs	47 50
75	teaspoons	3 75
83	dessertspoons	7 47
17	tablespoons	2 38
71	forks	3 55
71	knives	3 55
1	knifetray	15
1	thermometer	20
5	dishcloths	25
20	dishtowels	2 00
13	handtowels	1 30
1	picture	00
1	creamery	30 00

80	dinnerplates	$4 00
81	dessertplates	3 24
31	soupplates	93
11	breadplates	66
49	bowls, pint	1 47
67	mugs	3 25
16	syrup pitchers	80
1	syrup can	50
20	salts and peppers, 20 each	2 00
26	tea pitchers	5 20
7	mustardcups	35
5	vinegar cruets	25
2	bells	40
1	long brush	15
2	brooms	30
1	dustpan	10

KITCHEN.

1	breadboard	20
2	flour barrels	40
2	meat boards	25
1	refrigerator	8 00
2	small tables	3 00
1	long table	2 50
1	rocker	1 00
5	kitchen chairs	2 50
1	clock	3 00
1	teapot	25
1	large coffeecan	15

1 coffeepot	$0 30
1 gravy strainer	05
2 tea strainers	10
2 eggbeaters	10
1 icecream freezer	2 50
1 flourscoop	10
5 small tin cups	15
3 round caketins	15
3 square caketins	15
2 long caketins	20
7 breadtins	35
2 gemtins	30
2 teakettles	1 50
5 iron kettles	2 50
4 granite kettles	75
1 bean kettle	50
5 kettle covers	20
5 dripping pans	2 00
2 cooky pans	75
5 large stewpans	2 00
2 small stewpans	50
16 milkpans	2 40
13 agate pieplates	75
15 granite pieplates	80
3 five-quart pails	30
1 one-quart pail	10
1 two-quart pail	15
8 milkpails	2 40
1 tin pail	15
12 dippers	1 00

1	meat grinder	$1 25
1	coffee grinder	70
2	colanders	30
2	pan sieves	20
2	flour sieves	20
1	breadcutter	2 00
3	pancake turners	15
1	eggturner	05
1	rollingpin	05
2	potatomashers	10
2	icepicks	10
1	cookycutter	05
1	doughnutcutter	05
11	cookingspoons	55
11	forks	55
1	large fork	10
12	knives	60
4	breadknives	25
11	tureens	1 65
4	large platters	1 60
1	steamer	60
5	granite basins	50
1	large funnel	10
1	small funnel	05
83	one-pint fruitcans	2 49
172	one-quart fruitcans	5 16
14	two-quart fruitcans	70
40	jellyglasses	60

BOYS' BUILDING—STEWARD'S OFFICE.

1 cabinet file	$40 00
1 Ohmer file case	10 00
8 letter files	1 00
2 commodes	27 00
4 desks	85 00
1 letter press and stand	7 50
1 typewriter and stand	30 00
2 desk chairs	5 00
2 high desk chairs	3 00
5 chairs	4 00
2 safes	200 00
1 postage scale	50
3 inkwells	30
2 double inkstands	75
3 rulers	15
3 spindles	15
5 pictures	00
2 wire trays	40
2 eyeshades	10
1 spongeholder	10
2 inkpads	50
5 rubber stamps	1 40
4 clamps	10
1 billfile	1 00
1 pair scissors	10
1 screwdriver	10
1 tackhammer	10
2 armrests	50

1 feather duster	$0 50
6 towels	60
1 mirror	2 00
4 wastebaskets	2 00
2 whiskbrooms	10
2 mucilage bottles	10
1 box for pay envelopes	50
1 thermometer	10
2 cuspidors	80
1 dustpan and brush	25

SITTING ROOMS AND DORMITORIES.

75 yards ingrain carpet	35 00
30 yards brussels carpet	22 50
5 rugs	5 00
27 yards linoleum	8 10
3 doormats	75
1 tapestry curtain	2 00
3 pairs lace curtains	10 50
1 carpet sweeper	2 00
5 dressers	40 00
14 washstands	70 00
9 bureaus	72 00
3 writing tables	4 50
1 table, prison No. 404	7 50
2 3-foot round tables	3 00
1 3-foot table	1 50
5 6-foot tables	15 00
1 8-foot table	4 00

1	13-foot table	$6 50
4	chiffoniers	36 00
3	3-wing screens	2 25
8	wardrobes	64 00
1	large clock	3 00
2	bookshelves	1 00
1	bookcase	10 00
2	couches	14 00
15	lookingglasses	15 00
17	slat settees	34 00
22	veneer seat settees—21, 6-foot; 1, 4-foot	65 00
16	rocking chairs	16 00
2	Morris chairs	6 00
2	sleepy-hollow chairs	20 00
2	chairs, low back, upholstered	5 00
2	chairs, high back, upholstered	5 00
1	dozen plain chairs	9 00
145	common chairs	72 50
2	chairs, high back	3 00
1	barber chair	12 00
3	pair clippers	6 00
3	razors	2 25
1	razor strop	40
1	hone	75
2	lather brushes	40
3	pair nail scissors	75
2	pair hair shears	1 25
114	single beds, wooden	342 00
13	single beds, iron	52 00
2	three-quarter beds, iron	11 00

7	three-quarter beds, wooden	$28 00
6	double beds, wooden	30 00
126	mattresses—40 hair, 86 cotton	415 00
2	dozen rubber sheets	14 40
216	blankets	324 00
117	spreads	70 20
420	sheets	105 00
157	pillows, 16 feather	125 75
275	pillowcases	27 50
104	handtowels	10 40
194	rollertowels	39 80
2	toiletsets	9 00
8	washbowls and pitchers	7 00
6	chambers	1 50
4	stepladders	4 00
6	packing boxes	3 00
2	dozen whiskbrooms	1 20
6	dustcans	3 00
2	dozen dustpans	2 40
1½	dozen wooden pails	1 80
½	dozen sloppails	3 00
13	firepails	1 95
10	clothesbaskets	4 00

DINING-ROOMS.

2	extension tables	15 00
1	4-foot table	2 00
1	7-foot table	3 50
3	9-foot tables	13 50

5	10-foot tables	$25 00
3	16-foot tables	24 00
1	sink table	1 50
125	common chairs	62 50
20	dining chairs	40 00
11	dozen dessertspoons	11 88
2	1-6 dozen tablespoons, silver-plated	3 35
3⅔	dozen teaspoons, silver-plated	2 20
1½	dozen forks, silver-plated	2 25
2½	dozen knives, silver-plated	5 70
11½	dozen table knives and forks	13 80
1	carving set	3 00
1	16-inch steel	60
3	dozen napkins	3 60
6	dozen bibs	3 60
1	set dishes, 144 pieces	12 00
9	dozen dinnerplates	7 20
9	dozen dessertplates	4 32
10	dozen soupplates	3 60
2	soup tureens, covered	1 00
1	soupladle	15
12	bowls, 8-quart	2 40
5	vegetable dishes, covered	1 00
10	platters	3 00
4	dozen bowls	2 40
8½	dozen mugs	5 10
11	sets salts and peppers, glass	1 10
8	sets salts and peppers, china	1 00
11	4-quart pitchers	2 20
2	2-quart pitchers	14

1½ dozen saucedishes	$0 27
1½ dozen butterplates	18
9 coffeestands	45
4 dozen dishtowels	4 80
2 washboards	40
1 clock	3 00

KITCHEN.

1 icecream freezer	2 50
1 refrigerator, large	50 00
3 iron kettles, porcelain-lined	1 50
4 iron kettles	1 60
3 agate kettles	1 80
2 broilers	20
3 steel spiders	45
2 steel griddles, 20-inch	80
2 dozen tin pieplates	1 20
12 breadpans	60
8 cakepans	40
2 cakecutters	10
3 stovepokers	30
6 graniteware stewpans	3 00
8 graniteware saucepans	2 40
2 large drippingpans	1 80
3 small drippingpans	1 80
3 cookiepans	30
2 graniteware 4-quart pans	40
8 4-quart tin milkpans	40
6 dishpans	2 40

2 chopping bowls and knives	$1 30
1 iron gempan	15
4 tin gempans	40
6 butcherknives	90
6 large forks	30
1 large wooden spoon	10
1 dozen large iron spoons	60
2 2-gallon tin syrup cans	1 00
2 1-quart tin dippers	10
6 1-pint dippers	30
2 2-quart tin dippers	15
3 strainers	15
3 colanders	45
4 steamers	2 40
2 sets vegetable steamers	2 00
3 toasting frames	45
1 12-quart pail, graniteware	60
4 12-quart pails, tin	2 00
1 tin teapot	20
1 tin coffeepot	25
6 graniteware teapots	1 50
3 graniteware coffeepots	90
1 tin coffeebox	15
1 coffee grinder	50
3 tin skimmers	15
1 1-quart copper measure	20
1 ½-pint copper measure	15
2 large tin graters	10
1 small tin grater	05
3 rice boilers	1 20

2 wooden rolling pins	$0 10
8 wooden sugar boxes	1 60
1 8-pound scoop scale	3 00
2 wooden potato mashers	20
1 raisin seeder	75
3 tin spice boxes	30
1 dozen 3-gallon jugs	4 80
2 dozen 2-gallon jugs	7 20
2 dozen 2-quart fruitcans	1 00
8 dozen 1-quart fruitcans	2 88
4 dozen 1-pint fruitcans	2 16
6 dozen jelly tumblers	1 08
8 roller towels	1 60
1 marble top table	5 00
1 4-foot table	2 00
1 6-foot table	3 00
9 flatirons	2 80
1 meatchopper	1 50
1 hatchet	30
1 bucksaw	1 00
3 coalhods	1 80
2 coalscoops	90
1 wallbrush	15
1 mop	05
2 dozen brushes	1 20
2 dozen brooms	3 60
2 floorbrushes	1 00
30 feet $\frac{3}{4}$-inch garden hose	1 50

BAKERY.

1	mixing trough	$10 00
3	tables	2 25
1	cookie chest	50
1	counter scale	2 00
1	platform scale	7 00
1	dipper	25
118	breadtins	5 90
30	caketins	3 00
1	flour sifter, large	4 00
1	flour sifter, small	50
3	syrup cans	2 25
3	peels	2 10
1	pitcher	10
3	sugartubs	45
1	gingercan	05
2	flourpans	20
10	breadbaskets	6 00
1	cakebowl, large	3 25
1	cakebowl, small	75
2	cakecutters	30
1	2-quart measure	20
1	pint measure	10
3	tableknives	15
1	butterdish	10
3	oven grates	4 50
3	oven plates	6 00
1	firehook	50
2	fenders	20
2	coalscuttles	50

1	waterpail	$0 25
2	tablebrushes	30
1	step-ladder	1 00
2	brooms	30
1	axe	25
1	coalshovel	40
1	hatchet	25
1	clock	2 00
4	chairs	2 00
2	dustpans	20
2	scrubbing pails and brushes	50

SHOPS, ETC.—SHOE SHOP.

1	cutting plier	35
3	pegging jacks	75
1	grindstone	3 00
1	sprinkler	10
12	knives	1 15
6	heeldies	3 00
1	skiving machine	3 00
4	convex knife sharpeners	40
1	upper crimper	3 00
4	jacks	3 00
1	pincher	50
1	stretcher	35
1	leather roller	15 00
1	leather roller, incomplete	5 00
3	clamps	1 20
1	vise	2 00

30 pair lasts	$15 00
1 maul	1 00
2 sewingmachines	60 00
1 peg float	40
5 hammers	1 25
4 nippers	1 00
2 eyeletsets	70
2 eyeletpunchers	70
1 hookset	50
2 lasthooks	20
4 workbenches	4 00
3 chairs	1 50
3 waterpails	30
1 washtub for soaking leather	50
1 dustbrush	15
1 dustcan	1 00

CARPENTER SHOP.

1 large carpenter bench	25 00
2 fore planes	1 00
1 jack plane	25
2 smooth planes	20
12 hollow and round planes	3 00
1 match plane	30
1 curve plane	1 00
3 bead planes	75
1 small o. g. plane	25
1 handaxe	40
6 cold chisels	60

5 chisels	$1 25
1 crowbar	75
1 clamp	25
1 iron mitre box	3 00
3 manila ropes	4 00
2 step-ladders	2 00
1 extension ladder	8 00
2 handsaws	2 00
1 crosscut saw	3 00
1 compass saw	10
1 ripsaw	1 00
1 steel square	75
1 grindstone	4 00
7 screwdrivers	1 00
1 handscrew	75
2 pulleys	50
1 mortising machine, foot power	5 00
1 surveyor's level, with table	4 00
4 hammers	1 00
2 mallets	30
1 caddy opener	20
2 wire cutters	40
1 tapeline	50
2 10-foot poles	20
1 saw vise	30
1 vise	75
1 roller scraper	35
2 monkey-wrenches	70
1 sledgehammer	50
1 reeding tool	25

1 axe	$0 50
1 adze	75
1 pounder	15
1 jackscrew	1 00
1 pair snips	40
2 augers	75
1 snow shovel	10
1 broom	10
3 dustbrushes	15
1 stove	10 00
3 coalscuttles	75

PAINT SHOP.

1 extension ladder	12 00
1 30-foot ladder	2 00
2 16-foot ladders	2 00
2 6-foot step-ladders	4 00
2 7-foot step-ladders	4 00
2 9-foot step-ladders	4 00
1 table	2 00
1 papering board	1 00
2 chairs	1 00
1 stove	3 00
2 kalsomine pails	60
1 waterpail	25
1 lookingglass	50
2 screwdrivers	30
2 puttyknives	50
1 150-gallon oilcan	5 00

2 chisels	$0 60
1 hatchet	10
1 trowel	15
1 easel	1 00
2 stiplers	3 00
1 diamond	4 50
3 1-pound brushes	2 25
2 wallbrushes, 5-inch flat	1 50
2 wallbrushes, 3-inch flat	1 00
4 wallbrushes, 5½-inch flat	3 00
4 kalsomine brushes	6 00
6 tool brushes ½-inch to 1½-inch	1 80
3 varnish brushes, 1½-inch	90
4 Fitch flowing varnish brushes	72
4 paperhanger's smoothing brushes	3 00
4 whitewash brushes	2 00
2 outside paintbrushes	2 50
1 duster	40
1 dustpan	10

MISCELLANEOUS—LAUNDRY.

13 tables	26 00
4 benches	2 00
5 chairs	2 50
1 coal stove	30 00
2 coalscuttles	60
2 sprinkling pots	20
24 clothesbars	36 00
46 ironingtables	46 00

77 flatirons	$19 25
46 ironingsheets	3 95
4 clasps	40
8 yards of calico to cover mangle	25
12 polishers	1 20
1 fluter	1 00
½ dozen sleeveboards	90
32 iron stands	1 60
½ box of clothespins	40
8 clothesbaskets	4 80
8 washtubs	4 00
6 washboards	1 20
4 dippers	28
4 handtowels	40
4 mops	20
12 pails	1 20
4 brooms	60
1 long brush	15
1 dozen scrubbrushes	60
50 feet hose	1 50
1 step-ladder	1 00
2 tack hammers	20

BOILERHOUSE.

1 cupboard	1 50
3 towelracks	1 00
10 towels	2 00
1 watercooler	1 00
5 commodes	10 00

2 desks	$2 00
1 table	50
1 stand	25
6 chairs	1 50
2 workbenches	5 00
1 step-ladder	1 00
4 ladders	2 50
2 wheelbarrows	3 00
100 feet 1-inch hose	15 00
35 feet ash hose	4 55
2 firebars	1 50
3 scoop shovels	1 50
1 snowshovel	25
1 coalfork	25
1 pick	50
2 handhoes	1 00
5 pair pipe tongs	1 00
1 chain tong	2 00
1 closet tong	1 50
1 rake	50
1 hatchet	25
2 hacksaws	1 00
1 handsaw	25
1 bucksaw	75
2 axes	1 50
1 grindstone	5 00
5 lanterns	1 25
1 oiltank	1 50
3 oilcans	75
1 sprinkler	25

2 dippers	$0 10
5 pipe wrenches	4 75
3 monkey wrenches	2 50
1 Westcott wrench	1 00
1 S wrench	1 00
1 hydrant wrench	50
1 basin wrench	1 00
2 engineer's wrenches	1 00
1 solid wrench	2 50
1 adjustable tap wrench	2 00
2 dozen files	8 00
6 reamers	5 00
8 taps	4 50
2½ dozen drills	10 50
1 dozen bits	2 25
3 funnels	30
22 pipedies	13 00
2 diestocks	3 00
1 Jarecki die and stock	1 50
2 plumber's firepots	4 00
1 plumber's friend	2 25
2 small ladles	50
2 3-wheel pipe cutters	2 00
3 vises	11 00
1 forcepump	5 00
2 hammers	1 00
1 clawhammer	25
4 soldering irons	1 00
1 electric soldering iron	5 00
½ dozen coldchisels	1 50

7 hollow punches	$2 50
1 long handled gimlet	50
1 valve reseating machine	10 00
2 sets screw plates and taps	12 00
1 belt tightener	2 00
1 gasolene can	50
1 meltingpot	50
2 steel pinch bars	2 00
3 screwdrivers	1 25
2 screw clamps	1 25
2 pairs gas pliers	75
1 pair wire cutters	75
2 breast drills	3 00
2 braces	3 00
1 6-inch steel square	50
1 pair snips	75
1 blow torch	2 50

LADDER HOUSE.

1 30-foot ladder	2 00
1 20-foot ladder	1 40
1 16-foot ladder	1 00
1 14-foot ladder	80
1 12-foot ladder	50

FIRE APPARATUS.

1 chemical engine	300 00
1 hosecart	25 00

90	fire extinguishers	$675 00
800	feet fire hose	280 00
6	fire ladders	30 00
2	play pipes	10 00
3	hydrant keys	2 00
3	spanners	2 00

MEATHOUSE.

4	24-inch sawframes	3 00
12	24-inch saw blades	50
2	12-inch cleavers	3 00
2	8-inch cleavers	2 00
4	block scrapers	40
2	12-quart galvanized iron pails	50
1	800-pound platform scale	20 00
1	30-pound spring scale	5 00
1	sieve	10
3	16-inch steakknives	1 80
1	10-inch steakknive	40
2	8-inch steakknives	50
2	steels	1 20
2	block brushes	20
1	handhook	10
1	meathook	10
1	lantern	50
1	delivery handcart	3 00
1	delivery wheelbarrow	1 00
1	delivery sleigh	1 00
8	baskets	2 40

FARM HOUSE—FAMILY ROOMS.

10	windowshades	$5 00
2	rockers	2 50
1	center table	1 00
1	wardrobe	2 50
1	mirror	1 00
1	clock	3 00
1	bureau	2 50
1	toiletset, 7 pieces	3 00
½	dozen towels	60
2	tablecloths	2 00
12	pillowcases	1 20
7	double sheets	2 45
1	set dishes	10 00
1	doen teaspoons, silver-plated	1 25
½	dozen dessertspoons, silver-plated	78
½	dozen knives and forks, silver-plated	1 75
1	carving knife and fork	1 25
1	salt and pepper shaker	20
3	pudding dishes	45
2	thermometers	20
2	whiskbrooms	10
1	carpet sweeper	50
3	carpets	6 00
1	broom, dust pan and brush	45

BOYS' ROOM.

18	beds, iron	72 00
18	mattresses—17 cotton, 1 hair	47 50

18 bedspreads	$10 80
54 blankets	81 00
54 sheets	13 50
18 pillows—17 hair, 1 feather	14 00
36 pillowcases	3 60
6 dozen handtowels	7 20
1 dozen rollertowels	2 40
3 washbasins	45
1 sloppail	50
14 chambers	2 75
9 pictures	00
7 windowshades	3 50
3½ dozen chairs	16 90
1 bookcase	4 00
1 chiffonier	5 00
2 benches	3 00
1 large table	3 00
1 small table	1 50
1 mirror	1 00
1 bell	25
1 carving knife, fork and steel	1 50
1 syrup can	25
2 glass syrup pitchers	30
2 pepper bottles	10
3 3-quart pitchers	60
3 brooms	45
3 dust pans and brushes	75
1 floorbrush	50

KITCHEN.

1 large table	$1 50
1 small table	50
3 chairs	75
1 refrigerator	10 00
1 dozen dishtowels	1 20
½ dozen handtowels	60
1 carver and fork	3 00
6 paring knives	36
16 knives, 17 forks, 18 dessertspoons	3 27
1 breadknife	1 50
1 knifebox	20
¾ dozen large agate spoons	90
1 breadbox	25
1 bread basket and cloth	50
1 sugartub	15
1 saltcrock	10
2 colanders	20
3 wire strainers	30
2 steamers	1 50
1 broiler	10
1 spider	50
2 fryingpans	75
1 drippan, small	60
2 drippans, large	1 00
4 agate pans, 18 and 20 quarts	1 00
2 agate pans, 14-quart	75
¾ dozen milkpans, tin	1 35
4 dishpans	1 25
3 agate pails	1 00

1	rice boiler, agate	$1 00
1	2-quart coffeepot, agate	25
1	16-quart coffeepot, tin	1 00
2	teakettles	1 00
4	iron kettles	2 00
2⅓	dozen dinnerplates	1 40
1	dozen supperplates	48
2	dozen saucers	50
½	dozen mugs	30
1	5-6 dozen bowls	51
2	3-quart pitchers	40
3	2-quart pitchers	21
4	1-quart pitchers	20
2	platters	60
2	tureens	40
3	vegetable dishes	45
4	dippers	50
2	chopping bowls	70
	Stove poker, shovel and handle	50
2	brooms	30
1	dustpan and brush	25
2	coalbuckets	1 00

MISCELLANEOUS.

1	dozen crocks	3 00
2	step-ladders	1 25
100	feet ¾-inch garden hose	5 00
1	sprinkling can	25
1	lawnmower	3 00

1 bench	$0 50
1 cupboard	50
2 lawn chairs	50
1 shovel	20
1 ashcan	50
1 large can	50
1 dustcan	50
1 swillcan	50

BARN.

5 horses	500 00
1 3-seated closed carriage	350 00
1 2-seated etension top carriage	75 00
1 2-seated democrat	12 00
1 top buggy	75 00
2 2-seated open sleighs	100 00
2 cutters	20 00
18 horse blankets	13 50
2 whips	1 00
6 robes	15 00
2 double sets harness, light	45 00
3 single sets harness, light	20 00
1 single work harness, heavy	5 00
2 double work harnesses	35 00
3 laprobes, light	1 50
4 laprobes, heavy	5 00
5 flynets	5 00
4 horsebrushes	2 00
4 currycombs	40

4 hayforks	$1 20
1 manurefork	50
1 lantern	50
2 cuspidors	80
1 small cart	1 00
1 axe	60
25 feet ½-inch hose	2 00
3 brooms	45
1 dustbrush	15
1 duster, feather	60
1 thermometer	10
20 pictures	00
1 washstand	5 00
1 toiletset, 3 pieces	75
1 large clock	2 00
1 table	3 00
1 bed	7 00
1 mattress	9 00
1 spread	60
2 blankets	3 00
4 sheets	1 00
2 pillows	2 50
6 pillowcases	60
6 towels	60
1 dresser	8 00
1 wardrobe	8 00
7 chairs	3 50

FARM AND GARDEN TOOLS (INSTITUTION.)

1	pair bobs	$16 00
2	farm wagons	30 00
1	one-horse spring wagon	5 00
2	wagonboxes	10 00
2	dumpboxes	4 00
1	stoneboat	1 00
2	lawnmowers	6 00
10	wheelbarrows	10 00
1	2-horse mower	25 00
1	lawnroller	5 00
1	2-horse roller	15 00
3	one-horse cultivators	9 00
1	handcart	1 00
1	handtruck	1 00
1	Wiard weeder	1 50
1	drag	5 00
1	harrow	14 00
2	two-horse ploughs	8 00
1	one-horse plough	2 50
1	side-hill plough	4 00
1	snow plough	1 50
1	shovel plough	3 00
2	hand sleds	1 50
1	grindstone	3 00
4	axes	2 00
3	hayforks	75
4	spadingforks	2 00
7	manureforks	2 45
4	gardenrakes	1 20

6 short-handled shovels	$3 00
3 long-handled shovels	1 50
6 snow shovels	1 20
2 scoop shovels	80
1 pruningsaw	25
2 crosscut saws	1 50
1 icesaw	50
2 handsaws	1 00
8 pair icetongs	4 00
1 iceslide	1 50
2 reaphooks	50
2 grass scythes	1 00
1 level	1 50
1 clawhammer	25
1 hatchet	40
1 billhook	40
2 spraying pumps	5 00
6 paris green blowers	1 50
10 garden hoes	1 50
2 grubhoes	1 00
1 wheel hoe	1 00
2 mason trowels	50
1 plaster trowel	25
5 garden trowels	30
4 lawn rakes	1 00
4 pair pruners	2 00
36 hotbed sashes	9 00
3,000 flowerpots	30 00
32 bushel crates	8 00
2 pairs hedge shears	2 00

12	market baskets	$1 00
1	border knife	50
1	pair border shears	50
5	strawberry crates	75
4	wateringpots	1 00
150	feet garden hose	7 50
60	feet stovepipe	7 50
2	thermometers	20
2	lanterns	50
5	stoves	10 00
3	corncutters	75
2	spades	80
2	pounders	50
3	garden markers	75
2	scythe stones	10
2	crowbars	1 00
2	chisels	40
1	jackplane	25
3	paving hammers	75
1	brass syringe	35
4	pickaxes	25
1	logchain	75
4	rubber coats and hats	4 00
2	pairs rubber boots	1 00
2	step-ladders	2 00

FAIRMOUNT—FAIRMOUNT COTTAGE.

42	single beds	126 00
2	double beds	14 00

45 mattresses	$112 50
44 bedspreads	26 40
112 blankets	168 00
100 sheets	25 00
50 pillows	37 50
70 pillowcases	7 00
36 rollertowels	7 20
12 handtowels	1 20
30 dishtowels	3 00
4 tablecloths	6 00
6 napkins	60
10 teaspoons	50
40 desertspoons	3 60
40 knives and 50 forks	4 50
1 breadknife	2 00
1 set carvers	3 00
4 agate spoons	20
1 chopping bowl and knife	65
11 pictures	00
118 chairs	59 00
1 arm chair	75
1 desk	2 50
1 roller organ	12 00
12 lamps	4 20
3 bureaus	24 00
9 tables—3, 16-foot; 1, 10-foot; 1, 8-foot; 3, 7-foot; 1, 6-foot	46 50
2 clocks	6 00
1 scale	2 00
4 rockers	3 00

1	center table	$2 50
1	bookcase	5 00
45	windowshades	22 50
2	washstands	10 00
2	commodes	10 00
2	washbowls and pitchers	2 00
41	chambers	10 25
	Linoleum	6 00
1	breadbox	50
1	meatbox	1 00
1	refrigerator	8 00
2	icecream freezers	5 00
1	side table	2 00
1	slate pastry table	5 00
4	tumblers	06
9	pitchers	1 80
9	salts and peppers	90
1	bell	20
6	dippers	60
4	large dishpans	1 60
6	saucepans	1 80
1	potatomasher	10
1	teakettle	75
1	coffeepot	30
45	mugs	2 25
50	bowls	1 50
50	dessertplates	2 00
42	dinnerplates	2 10
8	breadplates	80
3	dozen soupplates	1 08

2	cooking kettles	$1 00
1	iron kettle	60
4	drippingpans	1 20
2	fryingpans	50
10	jugs	3 00
21	jars	5 25
160	fruitcans	6 40
5	lanterns	1 25
1	step-ladder	1 00
1	wringer	2 50
1	clothesbasket	50
3	clothsboxes	1 50
1	copper tank	5 00
4	wrenches	1 00
1	coalscreen	50
4	coalscuttles	1 00
7	floorbrushes	3 50
6	dustpans, dust brushes and brooms	2 40
1	cuspidor	40

BRUSH SHOP.

2	stoves	8 00
7	vises	70
1	saw	1 25
1	boring machine	1 00
2	pairs shears	2 00
1	grindstone	1 50

FARM.

1 side-hill plow	$9 00
1 one-horse plow	9 00
2 two-horse plows	20 00
1 three-horse plow	10 00
2 two-horse cultivators	12 00
2 one-horse cultivators	10 00
2 sets of drags	30 00
1 weeding machine	1 00
1 two-horse hayrake	15 00
1 one-horse hayrake	12 00
1 haytedder	30 00
2 hayrakes	50
3 lumberwagons	60 00
1 drill	15 00
1 seeder, wheelbarrow	3 00
1 cutter	12 00
1 reaper and binder	25 00
1 potatoplanter	20 00
1 ensilagecutter	25 00
1 lawnmower	3 00
2 stoneboats	2 00
2 landrollers	11 00
4 pair bobs	80 00
6 wheelbarrows	3 00
1 potato sprayer, 1-horse	30 00
1 disk harrow	12 00
1 spike-tooth drag	7 00
2 dumpboxes	15 00
1 mowingmachine	17 00

1 potatomarker	$1 50
1 potatohiller	5 00
4 crowbars	2 00
6 scoop shovels	3 00
6 snowshovels	90
4 garden rakes	1 60
2 grubhoes	1 00
20 grasshooks	3 00
2 spades	80
3 spadingforks	1 20
1 horse hayfork	75
3 long-handled shovels	1 20
3 pair horseblankets	6 00
1 set single harness	7 00
3 sets double harness	55 00
1 set double harness, light	25 00
12 milkcans	25 00
4 milkstrainers	4 00
1 iceslide	2 00
3 pair icetongs	1 50

COW BARN.

18 hayforks	4 50
3 long-handled shovels	90
2 short-handled shovels	60
1 dozen hoes	2 40
1 beetcutter	2 50
3 axes	1 05
3 ladders	3 75

1	stove	$3 00
5	lamps	10 00
2	bucksaws	1 20
100	feet ¾-inch hose	5 00
1	bonecutter	6 00
1	pair scales	7 00
4	heavy pails, wood	50
14	milkpails	4 50
1	milkwagon	50 00
2	wagons	35 00
2	cars	6 00
1	two-wheel cart	10 00
1	shovel plough	1 00
3	crosscut saws	4 50
3	manila ropes	2 25
1	hayknife	40
1	wagonjack	50

LIVESTOCK.

7	horses	700 00
1	bull	100 00
39	cows	2,340 00
1	heifer, two-year old	35 00
15	heifers, yearlings	450 00
4	calves	80 00
1	boar	20 00
17	breeding sows	340 00
12	shoats	180 00
82	young pigs	162 00
322	fowls	193 20

SUMMARY.

Superintendent's residence	$517 00
Main building	11,054 24
Music hall building	1,856 72
Hospital and dispensary	1,307 24
Girls' building	2,161 55
Boys' building and bakery	3,285 36
Shops (shoe, carpenter, paint.)	301 87
Miscellaneous (laundry, boiler house, ladder house, fire apparatus, meat house	1,779 73
Farmhouse	413 21
Barn	1,342 85
Farm and garden (Institution)	315 85
Fairmount	6,278 04
	$30,613 66

ANNUAL REPORT

OF THE

NEW YORK STATE

REFORMATORY FOR WOMEN,

AT BEDFORD, N. Y.,

For the Year Ending September 30, 1903.

TRANSMITTED TO THE LEGISLATURE JANUARY 4, 1904.

ALBANY
OLIVER A. QUAYLE
STATE LEGISLATIVE PRINTER
1904

BOARD OF MANAGERS.

JAMES WOOD	Mt. Kisco, N. Y.
CHARLES H. TURNER	Albany, N. Y.
Dr. H. ERNEST SCHMID	White Plains, N. Y.
JOSEPH BARRETT	Katonah, N. Y.
Mrs. HENRY MARQUAND	Bedford, N. Y.
Mrs. HENRY P. GRIFFIN	White Plains, N. Y.

OFFICERS OF THE BOARD.

JAMES WOOD	President.
Mrs. HENRY MARQUAND	Secretary.
JOSEPH BARRETT	Treasurer.

SUPERINTENDENT.

KATHARINE BEMENT DAVIS, Ph. D.

EXECUTIVE STAFF.

MAYE B. RUDGERS	Assistant Superintendent.
SUSAN A. ELLISON	Marshal.
MARY A. FARLEY	Steward.
MARGARET S. HALLECK	Resident Physician.
HADLEY W. McCROSSEN	Chief Engineer.

STATE OF NEW YORK

No. 18.

IN ASSEMBLY,

January 4, 1904.

REPORT OF THE BOARD OF MANAGERS

OF THE

New York State Reformatory for Women

AT BEDFORD, N. Y.

To the Legislature of the State of New York:

One change in the membership of the Board of Managers has occurred during the past year. Mrs. Charles Russell Lowell, who had been a manager for nearly three years, resigned in November, 1902. Mrs. Lowell has been widely known for many years for her devotion to the work of social reform in various aspects, and she was pre-eminently suited for the office of a manager. Her interest in the success of this institution did not end with the faithful and efficient discharge of her official duties, but she constantly supplemented the work carried on by the State by providing at her own private expense for the salaries of special teachers which the State authorities have not seen fit to allow, and continues to do this up to the present time. She has also contributed in various ways to the encouragement and benefit of the inmates, as will be more fully shown by the report of the superintendent. The managers regarded her separation from the board as a most serious loss to the institution. The vacant place was filled by the appointment of Mrs. Henry P. Griffin of White Plains, who entered on her duties in May, 1903.

Meetings of the board have been held regularly on the second Friday of each month, excepting August, when a quorum was not present.

CENSUS.

The number of inmates during the year has been as follows:

October 1, 1902	151
September 30, 1903	198
Smallest number on any day	151
Largest number on any day	201
Average for the year	186.7

Complete information in regard to the inmates, their nationality, character of offenses, care and classification, school and industrial work, recreations, etc., will be found in the report of the superintendent, which is sent herewith.

MOVEMENT OF POPULATION.

From the opening of the institution, May 11, 1901, to the end of the current fiscal year we have received 275 commitments. They have been distributed as follows:

Commitments from May 11, 1901, to December 1, 1901, 40; average per month, 6.

Commitments from December 1, 1901, to June 1, 1902, 102; average per month, 17.

Commitments from June 1, 1902, to February 1, 1903, 93; average per month, 10.3.

Commitments from February 1, 1903, to September 30, 1903, 40; average per month, 5.

It will be noted that the growth of the institution has been irregular. In the beginning, before the institution became known, it was natural that the number of commitments should be small. Early in December, 1901, following a visit of a committee from the Board of City Magistrates, the number of commitments began to increase, and until June, 1902, averaged 17 per month, of which an average of 13.7 came from city magistrates' courts.

In June, 1902, Judge Gaynor's decision on a writ of habeas corpus that city magistrates could not commit to reformatory institutions for disorderly conduct became known; a considerable number of women were discharged on writs and these discharges included commitments as common prostitutes, an offense named in the State Charities Law as cause for commitment to the three State reformatories for women. The number of commitments from city magistrates immediately decreased, and for the eight months following averaged only 4.3 per month. The number of commitments from other sources increased, however, so that the average total of commitments per month was 10.3.

Judge Gaynor's decision was carried by the district attorney of New York city to the Appellate Division of the Supreme Court. It not only sustained Judge Gaynor, but interpreted his decision to mean that under the Penal Code no summary conviction or convictions for offenses which do not amount to misdemeanors could be made to State reformatories. This immediately stopped all commitments from New York city magistrates.

In February, 1903, the bill providing for the abolishment of the reformatory was introduced into the Legislature and for six weeks no commitments at all were received. The bill was not enacted into law and since the adjournment of the Legislature we have received 35 commitments. The average for the last eight months has been lowered to 5.

That portion of the decision of the Appellate Division which dealt with the commitment of common prostitutes was carried to the Court of Appeals and argued before them in the latter part of June, 1903. Their opinion has not been handed down, but is expected daily.

Should the decision of the Appellate Division be sustained, there will undoubtedly be an effort on the part of the individuals and organizations of New York city who are interested in reformatory work to secure such legislation during the coming winter as will make it possible to impose reformatory sentences upon common prostitutes, habitual drunkards and frequenters of disorderly houses, the class of women for whom the three reformatories in New York State were originally intended.

On the other hand, should the decision be reversed, we shall undoubtedly face almost immediately the problem of overcrowding, and an appropriation for additional cottages will be even more imperative than at present.

EXPENDITURES.

The total cash expense for maintenance for the year was $43,575.59.

The average weekly expense for each inmate was $4.47.

The detailed accounts of expenses both for maintenance and from special appropriations will be found in the report of the treasurer which accompanies this.

During the year the hospital building has been completed, at a total cost of $7,980.90. The expense for the furnishing of the hospital has amounted to $490.70.

Officers and employees during the year:

Number, October 1, 1902, women	26
Number, October 1, 1902, men	11
Total	37
Number, October 1, 1903, women	29
Number, October 1, 1903, men	11
Total	40

Increase of officers and employees during year, 3.

The men employed at the institution are as follows: Chief engineer, assistant engineer, two firemen, two farm laborers, coachman, carpenter and three guards—one guard only is on duty at a time, making eight-hour shifts.

The women are as follows: The superintendent, assistant superintendent, physician, marshal, steward, housekeeper, stenographer, bookkeeper and storekeeper (Administration building); five matrons, eight assistant matrons, night watch (Reception house); housekeeper and cook (Reception house); trained nurse, two school teachers, cooking teacher, officer in charge of sewing-room and officer in charge of laundry.

We take great satisfaction in expressing our complete confidence in the ability and in the methods of the superintendent and believe that the record of the year fully justifies our judgment.

The executive staff remains unchanged since last year. Among the other officers there have been several changes, partly indicated as follows:

Resigned, women	17
Resigned, men (all guards)	4
Permanent appointments, men (all guards)	5
Temporary appointments, men (1 guard, 1 fireman)	2
Permanent appointments, women	18
Temporary appointments, women	5

Considerable inconvenience has at times been caused by the resignation of an officer to accept employment in another State institution. It is frequently found difficult to fill vacancies in these cases by taking candidates from the civil service lists, for the reason that the salaries paid to teachers, stenographers and other officers in the women's reformatories of the State are less than those paid for the same services in other State institutions.

The result is that an officer who has demonstrated her capacity by successful service in a reformatory frequently obtains promotion to a more profitable place in another institution, leaving her vacant post to be filled from those on the civil service list who have either been untried or have failed to succeed elsewhere. We would emphatically urge that there is in the whole field of State institutional work no more important department than that of the women's reformatories. The State has undertaken, within a few years past, adopting the hopeful views of modern social reform, to try to improve the lives, rather than to punish the misdeeds, of the girls with whom we have to deal. It must never be forgotten that this is a work of education. If this work is worth attempting at all, it is worth doing well, and it demands from the State a thorough, intelligent, and well-paid service in no respect inferior to that of any other institution.

DISCIPLINE.

It is the effort of the management to secure good order by teaching the inmates the value of self-control, by trying to stimulate their self-respect, and by obtaining their concurrence in measures which their better judgment will teach them are for their personal benefit and for the general good. It is our belief that the record of the year shows an encouraging condition. There are, of course, among so large a number of persons, a few who are not found easily amenable to such influences; there are at times a few who for various reasons it is necessary to place "in punishment"—that is, in cells on the third floor of the Reception house, for a shorter or longer time. But there has been no serious disposition to disobedience, and in some of the cottages there is a sort of pride in the reputation of the household, which is gratifying.

One annoyance which arises from using cells on the third floor, as stated, is, that when the women so confined are noisy their voices can be heard, owing to the peculiar construction of the corridors and partitions, throughout the whole building. It is possible for a turbulent girl to keep the whole house, with nearly one hundred occupants, awake with her discordant cries, and not infrequent for her to attempt it, to avenge herself on the officers and on her more fortunate associates. It is for this reason, in part, that a detached "disciplinary building" has been asked for.

In our last report reference was made to the disturbing effect of the "Gaynor decision" (which is more fully explained elsewhere). Under this decision 39 inmates have been discharged by writs of habeas corpus, sometimes on the application of relatives, but more frequently, it is supposed, by the agency of men acting from the worst of motives. It can be readily understood that the effect of these proceedings, involving sometimes two or three trips to the court in Brooklyn or elsewhere, with the consequent delays and suspense, have produced an irritating feeling of discontent and a sense of injustice, that money could procure freedom for some and the lack of it leave others deprived of liberty. And it must be claimed that the inmates have for the most part passed through this vexatious experience with fairly commendable patience.

There are a few inmates here, not to exceed three or four, who on account of maturer age or criminal record, or both, are not of the class for which this and similar institutions are intended. They are a disturbing element in their influence, and while we would not say that their improvement is impossible, it must be made at such cost of time and effort on the part of the officers that the care of such inmates is a serious drag on the work of the reformatory, and it is hoped that a way may yet be devised for the transfer of such inmates to some institution of another character.

PAROLE.

The success of any reformatory institution is measured by the number of inmates it reforms. It may be a beautiful machine, perfect in all its workings, and still be a failure if its results are not shown in the lives of those who go out from its doors. These results it is almost impossible to measure. We cannot measure spiritual or moral growth except so far it it is shown in conduct. A weak point in estimating the results of any reformatory work is the entire lack of provision for following up the lives of inmates after final discharge from the institution. If they are not known to fall again into the hands of the law they are usually counted "reformed." But even so much as this is seldom known with certainty.

Under the parole system, however, we have a means of keeping in touch with the inmate for a longer or shorter period according to the length of time elapsing between parole and expiration of sentence.

In the New York State Reformatory for Women the law fixes the maximum period of detention at three years. There is no minimum. The board of managers has entire discretion to determine this in accordance with its best judgment in each individual case. Much can be said on both sides, but we, as an institution, have acted on the policy of as early paroles as are at all consistent with reason. An early parole means the loss of the discipline, training and instruction which would come through longer detention. On the other hand, if there is fair reason to believe that the woman means to lead a respectable, self-supporting life, and if she is capable of earning an honest livelihood, we think that the effort to do so, together with the encouragement and moral support she will receive from the institution while so doing, will do more to strengthen her moral character and give a proper self-respect than a longer stay in the institution could possibly accomplish. Accordingly, in our life of two years and five months we have granted fifty paroles after detentions in the institution varying from three months to two years.

The mode of procedure is as follows: The superintendent prepares a report for the monthly meeting of the board of managers in which she recommends the inmates whom in her judgment it would be well to parole. She bases her judgment on the following points: First, conduct while in the institution as shown by the records; second, past habits and conditions of life so far as known which may throw light on probability of future well doing; third, physical condition as determined by resident physician; fourth, skill or ability to earn an honest livelihood; fifth, the surroundings in which it is possible to place the woman; sixth, the general character of the woman as estimated by the superintendent herself from all she can learn from all sources in regard to her.

On this information the board acts. It may order the parole or it may decide that further investigation is necessary. In no case has the board allowed itself to be influenced by applications for parole made by persons outside the institution—and these have been received in great numbers—except in so far as they may throw light on the problem of a woman's future surroundings.

As to results, we feel that we are entirely too young to speak with anything but the greatest diffidence. Yet, "What results can you show?" is the question most often asked us.

We have made a number of mistakes in individual cases. Failures sometimes come from putting a woman in the wrong place. "Incompatibility" is often a cause of trouble and may lead to actual wrongdoing. Every effort has been made to place the women suitably, and we feel encouraged by our measure of success. Paroled women are required to write to the superintendent the first of each month. The letter is signed in each case by the person into whose custody the woman is paroled. Many of the women write much more frequently than this to the superintendent and to other officers. The marshal visits the women at frequent but irregular intervals, usually once a month at least, except where they are at a considerable distance. The person into whose custody the woman is paroled is required to report at once to the superintendent if anything goes wrong.

The superintendent has prepared somewhat elaborate statistics of parole, not that these themselves are of any great value, but that they may serve as a starting point for what will come to have value if carried on through a series of years. We think, however, that one or two points are pretty clearly indicated by the figures.

It will be noted that while the average age at the time of commitment has been 21 years,* the average age of those who have violated parole is 25.5 years. No one under 22 years has been returned and only 4 individuals out of the 11 who have broken parole are under 25 years. This shows, so far as our experience goes, the truth of the generally accepted proposition that the younger the individual the greater the chance of reform.

The second point will be of interest to those engaged in temperance work. Out of 7 habitual drunkards paroled only 1 is doing well; 7 out of 13 cases of violation of parole were cases of drunkenness. The 4 returned women now in the institution were all brought back for this cause. All these cases are of women 24 years of age or over. They have been uniformly well behaved, quiet and industrious, while in the institution, and are perfectly capable of earning their own livelihood when not under the influence of liquor. In each case the woman was kept at least a year in the institution before parole was granted. The question now is, can we hope to cure them by keeping them away from temptation for a longer period? We are trying the experiment.

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*This has been the average age of the 275 commitments since the opening of the institution.

SPECIAL APPROPRIATIONS.

We greatly regret that the special appropriations recommended last year failed to pass the Legislature. The two cottages for inmates are already needed, as the Reception House is full, and girls entitled by good conduct to promotion to cottages can not be provided for. The houses for male employees are important, as the Reformatory is a mile and a half from the village, in a farming neighborhood where accommodations are not to be had. So great was the necessity for providing a home on the place for Chief Engineer McCrossen that one of the reception rooms in the Administration building was given up for the use of himself and his wife and child, that he might be at hand in case of accident to the electrical or other machinery. A cottage for him is an imperative necessity. The need of a disciplinary building has been referred to. All the farm fences should be repaired, while the condition of the front fences and the entrance, for a State institution constantly visited by many strangers, is little short of disgraceful.

Respectfully submitted.

JAMES WOOD, President,
JOSEPH BARRETT, Treasurer,
KATHARINE C. MARQUAND, Secretary.

Treasurer's Report.

For the year ending September 30, 1903.

Special appropriations:

Received from State Treasurer	$10,453 25

Payments were made from the following appropriations:

Farm and other utensils	$256 82
Fire apparatus	579 05
Hospital building	4,227 37
Interior furnishings	3 75
Hospital furnishing	490 70
Heat connections in prison building	439 35
Plant and fire risers	107 10
Improving, heating and lighting plant	483 73
Plumbing in gatehouse	250 00
Connecting boilers	600 00
Pipe covering	1,500 00
Elevator to kitchen	15 33
Windowguards, etc	1,500 00
	$10,453 25

General appropriations:

On hand October 1, 1902	$403 88
Received from State Treasurer	44,200 00
Total	$44,603 88
Disbursed	43,575 59
Balance on hand September 30, 1903	$1,028 29

Disursements and per capita cost of maintenance during the year were as follows:

	Total.	Per capita.	Daily per capita.
Salaries and wages	$19,746 21	$105.76	$0.2897
Expenses of managers	148 55	.795	.0021
Provisions	9,480 98	50.78+	.1390
Household stores	1,971 69	10.56+	.0289
Clothing	2,135 19	11.436	.0313
Fuel and light	6,341 96	33.96+	.0930
Hospital and medical	361 20	1.93	.0052
Shop, farm and garden	576 72	3.09	.0084
Ordinary repairs	1,161 36	6.22	.0173
Transportation of inmates	503 49	2.696	.0076
Miscellaneous	1,148 24	6.155	.0168
	$43,575 59	$233.39	$0.639

Average number of inmates	186.704
Average weekly cost of support	$4 47
Estimated value of home products	2,335 26
Estimated value of home products consumed	2,195 26
Estimated value of home products on hand	140 00

RECAPITULATION.

Balance on hand October 1, 1902	$403 88
Received from State Treasurer from general fund appropriations	44,200 00
Received from State Treasurer from special fund appropriations	10,453 25
Received from witness fees, etc	39 34
	$55,096 47

Paid from general appropriations.................	$43,575 59
Paid from special appropriations.................	10,453 25
Remitted to State Treasurer	39 34
Balance on hand September 30, 1903...............	1,028 29
	$55,096 47

Annual Report of Superintendent.

To the Board of Managers, New York State Reformatory for Women, Bedford, N. Y.:

Ladies and Gentlemen—At the beginning of the fiscal year our four cottages were practically full and we had 44 inmates in the Reception House. The few vacancies in the cottages were soon filled, and thereafter promotion for good conduct was possible only when a cottage girl was paroled, or in the cases where one was discharged on a writ of habeas corpus, or was returned to the Reception House for misconduct. The cottages have been kept full throughout the year and the increase in population we have been obliged to care for in the Reception House. This has meant the use of all the cells on the first and second floors, north wing; and at the end of the fiscal year, with a population of 198, of whom 82 are in the Reception House, the only vacant rooms are those on the third floor, north wing, popularly known as the "punishment corridor." But for the liberal policy of parole adopted by the board, and the fact that 19 inmates have been discharged during the year on writs of habeas corpus, we should have been obliged before this to use these cells for the ordinary purposes of rooms. As we have no disciplinary building, this would be most unfortunate. It would leave us absolutely without a place in which to isolate a refractory individual, and the discipline of the institution would unavoidably suffer. It is therefore earnestly hoped that during the coming winter provision will be made to care for the probable increase of population.

CLASSIFICATION.

The classification in use at the close of the last fiscal year is still maintained. The inmates are divided into three grades, known respectively as the "Cottage Girls" (high grade); the First Division, Reception House (middle grade), and Second Division, Reception House (low grade). The last two grades occupy the large building known as the "Reception House."

Each grade is kept separate in work, play and educational classes; each rooms on different corridors and has its own dining and recreation room, and each succeeding grade enjoys greater privileges.

On entrance, after a period of quarantine is passed, a girl is placed in the middle division and may work up or down, according to character and conduct.

At the beginning of the fiscal year we had 151 inmates, of whom 142 were women and 9 were infants.

The women were classified as follows:

Cottage (high grade)	98
First Division, Reception House (middle grade)	28
Second Division, Reception House (low grade)	16

At the end of the fiscal year we had 198 inmates, 189 women and 9 infants.

The number in each grade was as follows:

Cottage	107
First Division, Reception House	63
Second Division, Reception House	19

Six individuals have remained in the Second Division the entire year; thirteen have earned their promotion to First Division, and five have reached cottages from Second Division.

Sixteen have been degraded from First to Second; twelve have been degraded from cottages to Reception House.

Sixty-three have been promoted from First Division to cottages.

Thirty-five have gone out on parole. This result we consider very encouraging, as the percentage of persistent wrongdoers is small.

INDUSTRIAL CLASSES AND INDUSTRIAL WORK.

Our success as a reformatory institution will depend in a large measure on our ability to so train our inmates as to enable them to earn an honest livelihood when they leave us.

A large percentage of those committed here are not sufficiently well trained to like to do their work or to earn more than the smallest wages.

The necessary housework of the institution, the cooking, cleaning, waiting on table, washing, ironing and bedmaking, must be done by the inmates under supervision of the matrons. This gives desirable practice, but by itself can employ, at any one time, only a small percentage of the total number; nor can the supervising matrons give the time necessary to thoroughly train absolutely ignorant girls. In the kitchen, for example, the great stress is to get the dinner cooked and served on time, and so in other departments.

The tendency always is to put into the various housekeeping departments the women who already know something of the work in hand, and to bring pressure to bear to keep the women already trained as long as possible. The plea always is the impossibility of accomplishing the absolutely necessary work with raw recruits. This difficulty can be overcome only by the organization of regular classes for systematic training in the various departments of household work. Having had this training, it is easy to put comparatively competent women into kitchens, dining-rooms, etc. This will insure not only much smoother and more satisfactory running of the necessary housekeeping machinery, but also will give an opportunity for putting into practice what has been learned in the classroom, the two together supplementing each other and making a desirable preparation for those who are to go out to domestic service. The same is true of the laundry work and of the sewing and dressmaking departments.

Too much emphasis can not be placed on the necessity for systematic training in the first principles — the rudiments — before proceeding to comparatively complicated work.

Consider the officer in charge of the dressmaking-room, with two daily shifts of sixteen girls each, for the most part absolutely ignorant of sewing, and the dressmaking to do for two hundred inmates, and all the plain sewing to prepare for the same number. It will be seen that the incentive is great to pick out those who know something about sewing and let the rest go untrained.

Moreover, it is not every woman in our mixed throng who is adapted by nature or taste to domestic service, sewing or laundry work. In the reformatories for men, no one for a moment seriously considers limiting the trades taught to cooking and tailoring, though these occupations are highly respectable, and the remuneration of the chef or of the custom tailor is excellent.

In the reformatories for women we will never meet with a large measure of success until we recognize the industrial demands upon women to-day and provide training in a sufficient variety of lines to meet the variety of talent and disposition.

Here at Bedford we are still in the experimental stage and are necessarily feeling our way, but we believe we have made a start in the right direction during the past year.

At the beginning of the year we had but one industrial teacher, the instructor in cooking. We had had her one month. The sewingroom and laundry were in charge of women selected from the list of women officers and paid the salaries of women officers. We have not added to this list during the year. We have no industrial building, nor, with the exception of the sewingroom, rooms specially prepared or set aside for industrial work.

COOKING CLASSES.

The cooking classes are held in the kitchen of Huntington Cottage. Owing to the necessity of using the room for domestic purposes, it can be used for class work only in the afternoon. Two classes of eight members each meet from 2 to 5 p. m. twice a week each. The course includes twenty-four lessons, and is followed by six lessons in setting and serving the table. One class this year, which showed unusual ability, was given an extra course of twelve lessons. As interesting a class as we had was composed of girls of foreign birth, who could not write and were just learning to read. The recipes and directions were typewritten for them, and it proved a most successful class.

In connection with the work in cooking we should mention that on Monday afternoons during the late winter, spring and early summer, a course was given for the officers in charge of kitchens. The superintendent gave seven Mondays to the study of dietaries, including the composition of food, their uses in the body, the construction of dietaries, etc. One day was devoted to a consideration of the ration allowed by the State.

The cooking teacher gave twelve demonstration lessons. They were confined entirely to dishes suitable for institution use. She had worked out seventy-one recipes in quantities suitable for thirty persons and requiring a minimum of such luxuries as eggs, butter and milk. These were typewritten and placed in the hands of the matrons. We purpose to work up one hundred such recipes. The assistant matrons are using their ingenuity in the subject at present, each being asked to contribute to the collection.

CLASSES IN HAT AND BASKET-MAKING.

Fortunately for us our instructor in cooking (and three individuals have filled this position during the year) has always been able and willing to take charge of the classes in basket and hat-making, begun the latter part of the last fiscal year.

After considerable experiment with various materials, we have succeeded in making a satisfactory palmetto hat, usually sailor in shape. We buy the partially cured palmetto buds in Florida, dry and bleach in the sun, cut into narrow uniform strips by means of a simple little machine which we have christened the "Hill-McCrossen Machine," in honor of Dr. Robert Hill, Inspector of the State Board of Charities, who suggested its general plan, and of Mr. McCrossen, our chief engineer, who carried out his idea. The strips are braided and the braids sewed by hand. The hat is then dipped in a very dilute solution of gum arabic and pressed in a simple machine, also of home manufacture. The hats are very light, flexible and durable. We have been authorized by the Prison Commission to sell our surplus to other institutions. We shall never be able to produce a great number so long as the work is done entirely by hand. The training afforded by the work is, however, most excellent.

The materials for this work have all been provided by Mrs. Lowell, as well as that for the basket work, to which the last hour of each morning is devoted.

BASKET WORK.

This is the Deerfield reed and raffia work. Most of what we have done has been the sewed baskets in the various stitches, although the weaving has also been taught. We have done our own dyeing, using vegetable colors given us by Mr. Henry Scattergood of Philadelphia.

This work has been extremely successful. Hand, eye and æsthetic taste all receive training and the results have been really works of art. As we have no means of disposing of our products and the material has been given us, we have allowed the members of the class to send baskets to their families. This has contributed to the popularity of the work.

One of our paroled girls, who did excellent work, has had a class of several pupils (very young girls) throughout the summer.

WEAVING.

Through the generosity of Mrs. Henry Marquand, of the Board of Managers, we were able last spring to order an old-fashioned handloom from Barea, Ky. One of our foreign inmates, a Polish girl of seventeen, we found was an expert weaver of rag carpets; she also understood how to warp a loom and has been able to instruct us in the process. We had saved the clippings from the sewingroom since our opening, and the girls in odd moments have cut and sewed and wound balls of "carpet rags." So far we have woven twenty-two rugs for girls' bedrooms. Lowell is to be furnished throughout with them, and one large rug of several breadths has been made for Sandford sitting-room. There is much emulation now among the cottages as to who shall be ready for the next big rug.

PAPER BOX MAKING.

In the spring the assistant superintendent started a class of twelve members in paper box making, chiefly document filing cases and pill boxes for the medical department. As we have not yet been able to arrange for disposing of surplus, the class has been intermittent, making only enough for institution uses.

GARDENING.

Beginning in May, we have been enabled through the generosity of Mrs. Lowell to employ a special matron to take charge of the outdoor work. We have always desired to provide for regular instruction in floriculture and market gardening, but so far have been unable to do so. This has been the next best thing. Unfortunate weather in the spring has here, as elsewhere, resulted in small or no crops. Much of the planting, the work of weeding, and almost all of the gathering of the crops has been done by the girls, and the lawns, walks and driveways have been beautifully cared for by them.

This has also been the means of providing regular outdoor work for girls who have greatly benefited by it.

As heretofore, each cottage has had its own flower beds, and this year Huntington had in addition several vegetable beds of its own, the product of which tasted much better than those from the general garden.

LAUNDRY.

The work has been carried on along precisely the same lines as last year. As much instruction has been given as has been compatible with doing the work of the institution. As we have a complete steam plant it affords an opportunity to learn a good trade. Two of our paroled girls have places in laundries.

SEWING.

There has been only one change in the sewing department, and that was not made until toward the end of the year. The first three-quarters of an hour of each session in the sewingroom of the Administration building is now devoted to regular " model " work, the graded system as taught in Pratt Institute being used.

KNITTING.

Early in the year we purchased a knitting machine, and since that time we have made all the stockings we have used. One girl working half a day two or three afternoons in the week can keep up the stock. The stockings are finished by hand by the girls of the Second Division, Reception House (low grade).

SPECIAL EMPLOYMENT.

In a few instances we have been able to give special work to girls who seemed suited to it.

One girl, a high-school graduate, has been taught typewriting. On a machine loaned by the president of our board she has done much helpful work, such as copying recipes for cooking class, preparing report blanks, etc. She is doing all the typewriting on the annual inventory.

A girl who shows an aptitude for the care of the sick has acted as hospital attendant whenever the hospital has been in use, and has received special instruction from the trained nurse. Another responsible girl takes entire charge of the sorting and delivering the clothes at the laundry. Two girls act as assistants to the storekeeper. But the opportunities for special training are few.

The girls of the highest grade (cottage girls) have been quite fully occupied throughout the year. Almost without exception they have had school work for half a day and industrial work for half a day. The importance of full employment can not be overestimated.

The weakest point at present is the middle grade. A considerable number of these can not be occupied after 3.30 p. m., except by fancy work, and a small number have no regular employment at all in the afternoon except their gymnastic and fancy work. This is for them an unfortunate, almost a demoralizing, state of affairs. But for Mrs. Lowell's great interest and kindness this would have been true of a much larger percentage. The money placed in the superintendent's hands by her has made the difference between what must have been an unsatisfactory and what we consider a very fairly satisfactory year's work.

The industrial schedule has been as follows:

INDUSTRIAL SCHEDULE.

Laundry 8.15 to 11.45 a. m., Monday and Tuesday 17, on other days 14 girls; 1.15 to 4.45 p. m., another shift of same number. These girls are from the First Division (middle grade) Reception House.

Sewingroom, Administration Building: 8.30 to 11.45 a. m., 16 cottage girls; 1.15 to 4.30 p. m., another shift of same number.

Sewingroom, Reception House: 9.30 to 11.45 a. m., all members of First Division not otherwise employed.

Class in basket and hat making—two hours devoted to hats, one to baskets: 8.30 to 11.45 a. m., 16 to 20 cottage girls.

Cooking class: 2 to 5 p. m., Tuesday, Wednesday, Thursday and Friday, 8 cottage girls.

Garden class—last half of May, June, July, August, September: 8.30 to 11.45 a. m., 8 to 12 girls, according to character of work to be done, from First Division, Reception House: 1.30 to 4.30 p. m., from cottages.

SCHOLASTIC WORK.

The school work has gone on as smoothly and with as satisfactory results as could reasonably be expected, when we consider the fact that each set of classes has changed hands several times. One set of classes has been taught by three and one by four individuals during the year, as follows: Classes I to III, regular teacher (resigned to accept better position), temporary supply, regular teacher (resigned one week before end of current year to accept better position), new teacher for last few days of year. Classes II and IV, assistant superintendent, teacher furnished by Mrs. Lowell (two different individuals), regular teacher from June 22 to September 29. Class V, superintendent, assistant matron, Reception House, regular teacher, temporary supply.

Continuity of work has been absolutely impossible. Nor has there been the opportunity to improve and develop it that there would be under one teacher who proposed to stay for a considerable period. So long as the salaries paid teachers in the reformatories for women are less than those paid in other State institutions we shall meet with this difficulty.

SCHEDULE OF SCHOOL WORK.

(Five days in the week; fifty weeks in the year.)

I. 8.30 to 11.45 a. m.: Intermediate class; cottage girls, 26 pupils.

II. 8.30 to 11.45 a. m.: Primary class; cottage girls, 22 pupils.

III. 1.15 to 4 p. m.: Advanced class; cottage girls, 26 pupils.

IV. 1.30 to 3 p. m.: Class from First Division, Reception House (middle grade), 22 pupils.

V. 3 to 4 p. m.: Class from Second Division, Reception House (low grade), 10 to 16 pupils.

The first month of the fiscal year Class II was taught, as it was last year, by the assistant superintendent, but during the vacation of the superintendent it was impossible for her to take the time. No one else was free to go into the schoolroom and it seemed most undesirable to suspend this or to shorten the sessions of the other classes. Mrs. Lowell, as usual, came to the rescue, provided a teacher at her own expense and continued her services until, in June, the employment of a second teacher was authorized by the authorities.

The middle grade has been provided for least satisfactorily. With a number varying from 28 at the beginning of the year to 63 at the close of the year, we have been able to provide one and a half hours daily instruction for 22 inmates only. The size of the class can not be increased as the schoolroom will not hold more seats. Indeed, in any case it would be undesirable, as one teacher could hardly do satisfactory work with a larger number of pupils no better graded than these can be. We have chosen the younger girls and those who could not read or write. The class has been necessarily ungraded, and the progress made under unfavorable circumstances reflects great credit on the teachers.

The superintendent and assistant superintendent have had too much on their hands during the year to do regular teaching. The matrons of the Reception House have been completely occupied with the duties proper to their positions. An additional teacher for the middle grade is needed if we are to do the educational work imperatively necessary in a reformatory institution.

Reading, spelling, writing, arithmetic, geography, American history, drawing, nature study and lessons in the English language and composition have been the subjects taught.

We consider the drawing work particularly satisfactory. Work in designing has greatly interested the pupils and resulted in a competition for the best design for dining and sitting room wall borders. The prettiest, most suitable and most practical designs were selected for each cottage, and in two cottages have been successfully painted upon the walls by the designers. The other cottages are to be treated in the same manner.

Each Saturday afternoon throughout the year a class in physiology and hygiene has been conducted by the resident physician. The course covers five months. The class under instruction at the beginning of the year has completed its course, as well as a second class, and the third class begun is nearly through. Each class numbers twenty members. The instruction is given by means of talks, demonstrations, dissections, exhibits under the microscope, etc. Each member keeps a note book and weekly quizzes and a final review is given.

We believe that the lessons have been very helpful to the women. So far as possible we have given the mothers, not only of children in the institution but those who have children outside, preference in making up the classes.

As heretofore, the superintendent has conducted a singing class two evenings in the week, each class being attended by half the members of the two highest grades.

On Saturday our daily program is varied and has been as follows, throughout the year:

Morning: The laundry, sewing, basket and garden classes for the last four months, as usual.

11 to 12 a. m.: Sabbath school for Jewish girls, who are excused from their regular work.

1.30 to 3 p. m.: Basket class for inmates of Lowell Cottage.

1.30 to 3 p. m.: Inmates of Gibbons Cottage meet and do fancy work while a teacher reads aloud.

These last two cottages house our youngest girls and we like to keep them fully occupied.

The first half of the year Gibbons made baskets and Lowell did fancy work.

3 to 4 p. m.: Physiology class, conducted by resident physician.

For the last ten months:

3 to 4 p. m.: Dancing class for half the cottage girls.

4 to 5 p. m.: Dancing class for half the cottage girls.

The following table shows the classification of the inmates received during the year, upon admission to the institution:

Do not read or write any language	12
Read and write a foreign language, no English	5
Read and write, no further education	32
Read and write, have studied common English branches in public school	32
Graduated from grammar school	7

Have studied a year or more in high school	4
Have graduated from high school	2
Have graduated from high school and taken course in business college	1
Have studied further after graduation from high school	2
Total	97

The percentage of illiteracy is 12+ per cent. this year as against 10+ per cent. last year.

GYMNASTIC WORK.

The first two months of the year we were obliged to discontinue the work in gymnastics, as there was no one who had time to carry it on. We felt that this was a serious matter. Many of our younger girls are overflowing with energy which must be worked off in some way. Few can sit, stand or walk properly; many have in carriage the distinguishing marks of the "fast" woman which must be eradicated before they can hope to lead respectable lives; others are below par physically and need regular and properly directed exercise to fit them for work.

Realizing the need, Mrs. Lowell proceeded to supply it and authorized the superintendent to engage a physical instructor at her expense. Believing that the Swedish system was best adapted to our need, the superintendent wrote to the Boston Normal School of Gymnastics for a teacher. Miss Sara Louise Shaw was sent and has filled the position since that time. She conducts five classes daily. These classes contain practically all the inmates, with the exception of those who work in the laundry afternoons and those excused by the physician.

As we have no apparatus, the work consists entirely of free standing exercises and gymnastic games, of which basket and captain ball rank as favorites.

The work has been very satisfactory; the improvement in the carriage of our girls is particularly noticeable. We consider it also an important factor in the institution discipline. The lessons in self-control, prompt obedience to orders and precision are of as great moral value as are the exercises themselves from the physical point of view.

On Saturday afternoon the gymnastic work has been varied. The exercise has been given in the form of dancing lessons to the cottage girls. Two classes each composed of the inmates of two cottages have one hour sessions each. These classes have been much enjoyed and we believe have been profitable as well.

RELIGIOUS SERVICES.

Since the opening of the institution religious services for the Catholic inmates have been held each Sunday by Rev. Father F. X. Kelly, pastor of the church of St. Francis of Assisi, in whose parish we are, or by his assistant; confession has been held and mass said on the church holidays and monthly through the past summer. Father Kelly has also conducted a catechism class each Sunday. He has been untiring in his pastoral duties and has made many visits to our sick during the year.

Catholic prayers are conducted each evening by the matrons of the respective houses, and on Friday evenings in the chapel for all Catholic inmates.

Protestant services have continued to be held each Sunday afternoon and have been conducted in turn by Rev. Messrs. Hoyt and Reed of Katonah, Mr. Luquer of Bedford and Rev. Messrs. Merriam of Mt. Kisco. Mr. Wood and Mr. Barrett of our board of managers continue to conduct one service each month.

Sunday school is held every Sunday morning for the Protestant girls. They are divided into three classes, which are taught by officers of the institution. Evening prayers are conducted for them by the matrons of the various houses.

Sunday evening services in which all inmates, irrespective of religious affiliation take part have been held at frequent intervals through the year. On these occasions the superintendent, an officer, or guest gives a talk on some ethical question and all join in singing and responsive reading.

Religious instruction in their own faith for the Jewish inmates was a problem we were unable to solve until February last. At that time we had 18 Jewish girls in the institution. There is no Jewish congregation nearer than New York city. After discussion with members of the National Council of Jewish Women, we decided that a woman could probably get closer in touch with the girls than a man, and that some simpler service might be more productive of results than a formal service conducted by a rabbi. Accordingly it was arranged that Miss Rossetta Stone of New York city should come to us every Saturday and conduct a Sabbath school class for the Jewish girls. The results have justified our decision.

In addition to the regular class work, Miss Stone devotes from one to two hours each week to personal interviews with such of the girls as care to talk with her; she also corresponds with several of them. In this way she has been able to win their confidence, and in a number of cases there have been marked results in the improvement in daily conduct. She has also interested herself in looking up Jewish homes and has placed two girls who have gone out on parole.

AMUSEMENTS.

We have again been entertained and instructed during the year by the illustrated lectures on foreign travel, given through the fall and winter by the president of our board of managers.

On one occasion we had the pleasure of having with us Miss Vaux of Philadelphia, who gave us an account of her experiences in the Canadian Rockies and showed us with the stereopticon most wonderful views.

Thanksgiving Day was celebrated by a good dinner and in the afternoon a match game of basket ball was played between picked teams of officers and inmates—the latter won.

On Christmas we had a Christmas tree, a program by the inmates and a visit from Santa Claus, who remembered each person present.

On New Year's Day the superintendent kept open house through the afternoon and evening, receiving each cottage and the two divisions of the Reception House in turn. The demeanor of the guests would have done credit to any rank in society.

On July 4th we had a picnic on the campus, participated in by inmates, officers and the members of the board and their families. We had a patriotic program of speeches, music, recitations, the reading of the Declaration of Independence, etc., closing with a beautiful drill conducted by the teacher of gymnastics and given by 32 pupils selected from the cottages. A band was provided by contributions of officers, supplemented by a gift from Mr. Turner. This was followed by a picnic supper and the evening closed with fireworks.

Informal dancing parties in the assembly room are allowed the girls by divisions about once in six weeks.

Realizing the social isolation of the reformatory officers, due largely to its location, Mr. Wood placed at our disposal through the summer a cottage known as Rockledge situated on his estate. This has been occupied over Sunday by groups of three officers in turn and has given a delightful outing much appreciated by all who enjoyed Mr. Wood's hospitality.

GIFTS.

We are indebted to the following friends for gifts to the institution during the year:

Flag and painting of flagpole, Major William H. Male.

Hand loom for weaving of rag rugs, Mrs. Henry Marquand.

Row boat, Mr. William H. Lyon.

Books for library, Miss Alice Sandford.

Dye stuffs, Mr. Henry Scattergood.

Twenty framed pictures, The Art Workers' Club, New York.

Money for Fourth of July celebration, Mr. Charles H. Turner.

Money for Christmas celebration, Mr. James Wood.

Barrel of gladiolus bulbs, Mr. James Wood.

Bulbs and plants, several barrels of apples and other fruit, Mr. James Wood.

Fireworks for July 4th, Mr. W. L. Howell.

Mrs. Charles Russell Lowell, $961.15, expended as is shown in the following account:

Katharine Bement Davis, Superintendent, in account with Mrs. C. R. Lowell.

Receipts:

Cash on hand, September 30, 1902	$35 90
Received November, 1902	30 00
Received December 1, 1902	13 00
Received January 5, 1903	150 00

Received March 2, 1903	$75 00
Received April 6, 1903	75 00
Received April 30, 1903	75 00
Received May 30, 1903	285 00
Received July 1, 1903	27 25
Received August 31, 1903	100 00
Received September 30, 1903	95 00
Total	$961 15

Expenditures:

Miss Shaw, teacher of gymnastics, salary for 9½ months, at $45	$427 50
Mrs. Nickelson, school teacher, salary for 5 months, at $25	125 00
Mrs. Nickelson, school teacher, salary for 1 month, at $30	30 00
Mrs. McCrossen, school teacher, salary for 1¼ months, at $25	31 25
Mrs. McCrossen, supply	13 34
Miss Pratt, in charge of gardening, salary for 4 months and 10 days	110 00
Mrs. Shortell, assistant in prison, salary for 5 months, at $25	125 00
Materials for classes in basket and hat making, reed, raffia, palmetto, needles, thread, etc	77 51
Total	$939 60
Cash on hand, September 30, 1903	21 55
	$961 15

COMMENTS ON STATISTICAL TABLES.

In view of the vicissitudes of the past year, a few remarks on the change in character of commitments may be in order.

Last year nearly 90 per cent. of all commitments were from Greater New York. This year the percentage fell to 77. There was both an absolute and a relative increase in commitments from outside counties; the former due to the fact that the institution is better known; the latter to the uncertainty of the law in regard to jurisdiction of city magistrates.

The absolute and relative number of commitments from General and Special Sessions has increased, there being 48 this year as against 37 cases last year from these courts. The percentage has increased from 25 to 49.5. By far the largest number of cases committed by these courts are of women convicted for grand and petit larceny; 40 cases out of a total of 49 during the year have been for this offense.

With the increase in the larceny cases has come an increase in the percentage of colored women. The percentage has increased from 11 per cent. last year to 23 per cent. this year. Of the 23 colored women committed, 13 were born in the Southern States—the majority in Virginia—5 in New York city, and 5 in other counties. Most of the Southern colored women were brought north by employment bureaus.

There has also been an increase n the percentage of domestic servants committed—43 per cent. this year as against 35 per cent. last year.

On the other hand, the percentage of foreign born has fallen from 39.8 per cent. to 24.7 per cent.

The percentage of Jewish girls committed from New York city has risen slightly; 14 per cent. of those committed this year have been of that faith as against 12 per cent. last year.

The question of domestic service is of special interest to us. In the first place, nearly half our girls were in service at the time of their commitment and a considerably larger number have been servants at some time or another. Moreover, not only are facilities better for giving training in household work, but it is far easier to place a woman in service when she goes out on parole than to find any other occupation for her. Since it became known that we placed girls at domestic service we have had a list of places waiting to be filled, while it has been extremely difficult to find openings in other occupations, no matter how competent we may believe the girl to be.

It is a curious illustration of the peculiar workings of the human mind that in ninety-nine cases out of a hundred the refusal to give a chance to the girl is not based on the economic ground of supply and demand, but on the moral ground of unwillingness to run the risk of contaminating the other employees—while the same man will gladly receive the same girl into his own family as maid to come very likely into much more intimate relations with his own children.

Of the 42 domestic servants received this year 17 were colored, 14 were American born white girls, and 11 of foreign birth. But only 4 of the white American born were of American parentage.

And in this connection it is sad to say that out of 16 with no occupation, which means that in almost every case the girls were dependent entirely on illegitimate means of support, 10 were American born, 3 colored and 3 foreign.

The offenses for which domestic servants were committed were as follows:

Ungovernable child	3
Manslaughter	1
Injury to property	1
Forgery	1
Assault	1
Petit larceny	9
Grand larceny	11
Disorderly conduct (4 colored)	5
Common prostitutes (2 colored)	10
Total	42

Of course we are aware that by themselves these figures mean little or nothing, but it will be interesting to note the fluctuations from year to year, and, taken in connection with the figures from similar institutions, may prove of value to the penologist.

STATISTICAL TABLES—GENERAL.

I.

Movement of Population.

Inmates, October 1, 1902		151
Commitments during fiscal year		97
Returned from parole		6
Infants born		4
Total		258
Paroled	35	
Infants gone out with mothers	3	
Transferred to insane asylums	3	

Died	1	
Discharged by supreme court	19	
Total	61	
Deduct repetition	1	
		60
Population September 30, 1903 (women 189, infants 9)		198

II.

Counties.

Kings	8
New York	66
Richmond	1
Total, Greater New York	75
Suffolk	3
Westchester	19
Total	97

III.

Court.

City judge	8
City magistrate	28
General Sessions	38
Justice of the peace	6
Police justice	7
Special Sessions	10
Total	97

IV.

Offense.

Misdemeanors:		
Injury to property	1	
Petit larceny	18	
Using child for begging	1	
		20
Felonies:		
Assault, first degree	1	
Attempt to commit grand larceny	2	
Forgery, second degree	1	
Grand larceny, second degree	22	
Manslaughter, first degree	1	
Manslaughter, second degree	1	
Receiving stolen goods	1	
		29
Other offenses:		
Associated with disorderly and dissolute persons	2	
Common prostitute	30	
Disorderly conduct	7	
Disorderly or ungovernable child	5	
Habitual drunkard	3	
Stopping and annoying men	1	
		48
Total		97

V.

Age.

15 years	4
16 years	8
17 years	11
18 years	3

19 years	9
20 years	8
21 years	10
22 years	8
23 years	9
24 years	9
25 years	6
26 years	3
27 years	3
28 years	2
29 years	3
32 years*	1
Total	97

Average age, 21 years.

VI.

Occupation.

Chambermaid	2
Cigarmaker	2
Clerical work	2
Domestic	42
Dressmaker	4
Factory operative	9
Housewife	3
Laundress	4
Milliner	2
On stage	3
Saleswoman	5

---

* No age given on commitment paper. Woman afterward taken out on writ of habeas corpus and discharged on ground of age.

Telephone operator	1
Waitress	2
No occupation	16
Total	97

VII.

Birthplace.

Austria	2
England	2
Germany	4
Hungary	6
Ireland	3
Italy	1
Mexico	1
Poland	1
Russia	1
Sweden	3
United States (white 50, colored 23)	73
	97

American born	73
Foreign born	24
Total	97

VIII.

Nationality of Parents.

Both parents American (white 15, colored 21)	36
Both parents Anglo-Indian	1
Both parents Austrian	3
Both parents Canadian	1

Both parents English	1
Both parents German	10
Both parents Hungarian	6
Both parents Irish	9
Both parents Italian	1
Both parents Polish	1
Both parents Russian	2
Both parents Swedish	3
Both parents Welsh	1
Both parents unknown (2 colored)	4
Father Canadian, mother American	1
Father Irish, mother American	4
Father unknown, mother American	2
Father American, mother Canadian	1
Father American, mother English	1
Father American, mother French	1
Father American, mother German	2
Father Canadian, mother unknown	1
Father English, mother Mexican	1
Father French, mother English	1
Father German, mother French	1
Father Irish, mother English	1
Father Irish, mother German	1
	97

IX.

Religion.

Jews	11
Protestants (Babtists 13, Episcopalians 11, Lutherans 4 Methodists 13, Presbyterians 7)	48

Roman Catholics	31
No religious preference	7
Total	97

X.

Social Relations.

Married	32
Single	65
Total	97

Divorced	4
Separated from husbands	12
Widows	3
Married women who have had children	18
Unmarried women who acknowledge having children	9

XI.

Have Been Inmates of Other Institutions (so far as can be ascertained).

Almshouse	1
Catholic Protectory, Westchester county	3
House of Mercy, Inwood	2
House of Refuge, Hudson	2
House of Refuge, Randall's Island	3
Orphan asylums	3
Penitentiary, Kings county	4
Penitentiary, New York county	4
Wayside Home, Brooklyn	1
Total	23

STATISTICS OF PAROLE.

I.

Institution opened May 11, 1901.

Paroled from May 11, 1901, to September 30, 1901	1
Paroled from September 30, 1901, to September 30, 1902	12
Paroled from September 30, 1902, to September 30, 1903	37
Total	50
Deduct still unplaced, 2; repetition, 2	4
Total left institution on parole	46

Detail.

Discharged by Supreme Court	1
Sent to relatives in Europe	4
Dead	2
Returned from parole and still in institution	4
Violated parole and whereabouts unknown	5
Maintaining correspondence	30
Total	46
Have been returned from parole since opening of institution	8

Of these:

Discharged by Supreme Court	1
Died	1
Reparoled	2
Still in institution	4
Total	8

Note.—The two women reparoled have both again violated parole and are included in the five above whose whereabouts are unknown.

II.

Offenses for which paroled women were committed and the proportion in each class who are maintaining correspondence and doing well.

Offense.	Number paroled.	Maintaining correspondence.
From trial courts:		
Assault	3	2
Forgery	3	2
Keeping disorderly house	1	1
Grand larceny	7	6
Petit larceny	3	2
Total	17	13
Summary convictions:		
Disorderly conduct and common prostitutes	19	13
Habitual drunkards	7	1
Ungovernable child	3	3
Total	29	17
Grand total	46	30

Note.—Of the 19 common prostitutes paroled four were sent to Europe and one has been discharged by Supreme Court. This leaves only one who has violated parole, so far as known.

III.

Age of Paroled Women.

16 years	2
17 years	5
18 years	2

19 years	4
20 years	4
22 years	5
23 years	7
24 years	3
25 years	3
26 years	4
27 years	5
28 years	1
29 years	1
Total	46

Average age, 22+ years.

Age of 11 individuals who violated parole:

22 years	1
23 years	1
24 years	2
25 years	1
26 years	2
27 years	2
28 years	1
29 years	1
Total	11

Average age, 25.5 years.

IV.

Character of Violation of Parole.

Intoxication	7
Left place without permission to avoid supervision	5
Brought back on account of illness	1

Two inmates were reparoled and broke parole a second time.

V.

Occupation of Those Maintaining Correspondence.

Domestic service	15
Dressmaker (lives with employer)	1
Factory operatives (live with relatives)	5
Housewives (married women)	2
Laundry employees (live with family)	2
Packer in drug house (lives with brother's family)	1
Saleswomen (live with parents)	2
With family (one of these is in poor health, the other assists aged mother)	2
Total	30

VI.

Length of Time Away from Institution of Those Maintaining Correspondence.

Have been on parole—

1 year, 7 months	2
1 year, 6 months	1
1 year, 5 months	2
1 year	2
10 months	1
9 months	1
8 months	5
7 months	4
6 months	4
5 months	2
3 months	1
2 months	1
1 month	4
Total	30

VII.

Of those paroled during fiscal year there are:

Dead	2
In Europe	1
Violated parole and returned	3
Violated parole and unfound	3
Maintaining correspondence	26
Total	35

VIII.

Length of Stay in Institution of Those Paroled During Fiscal Year.

Paroled after stay of—

5 months	1
8 months	1
10 months	1
11 months	1
1 year	5
1 year, 1 month	1
1 year, 2 months	3
1 year, 3 months	6
1 year, 4 months	5
1 year, 5 months	1
1 year, 6 months	1
1 year, 7 months	2
1 year, 8 months	2
1 year, 9 months	1
1 year, 10 months	2
1 year, 11 months	1
2 years	1
Total	35

IX.

Paroled During Fiscal Year—Into Whose Custody.

To parents	6
To employers	19
To husbands	3
To brother	1
To sisters	3
To aunt	1
To hospital	1
To Lunacy Commission	1
Total	35

Respectfully submitted.

KATHARINE BEMENT DAVIS,
Superintendent.

Bedford, N. Y., October 1, 1903.

Physician's Report.

To the Honorable Board of Managers:

Ladies and Gentlemen—During the year ending September 30, 1903, six successful operations were performed in the new hospital of the institution, viz, one of appendicitis, one of internal hemorrhoids, one abortion, and three curettements.

Three cases—one of clubfoot, a double ovariotomy (tubercular) and an abdominal hernia—were taken to New York city for operation. The last case died after a lingering illness of five months.

Four children have been born in the institution.

Among the 97 commitments of the past year, 13, or a little over 13 per cent., had syphilis. There are in the institution under treatment 21 cases, or about 10 per cent. of our inmates. There are 15 cases of gonorrhea in active and latent stages. Six of these cases were committed during the past year, making 6 per cent. of the commitments. Thus 19 per cent., nearly one-fifth of our inmates, who have come to us the past year suffer from venereal disease.

The following cases have been treated:

Abortion (induced necessarily)	1
Acne	2
Appendicitis	1
Alcoholism	5
Abscess	2
Blepharitis	2
Catarrh (nasal)	12
Cerebellar hemorrhage	1

Chorea	1
Dermatitis venenata	6
Endometritis	12
Epilepsy	2
Furunculosis	6
Grastralgia	1
Gonorrhea	13
Hemorrhoids	3
Hordeolum	2
Hepatitis	1
Hysteria	5
Insanity	3
Labor	4
Lupus	1
Lymphangitis	3
Menorrhagia	6
Migraine	6
Morphinism	2
Neuralgia	6
Ovaritis	12
Pharyngitis	6
Rheumatism	6
Syphilis	21
Tonsillitis	5
Tinea	1
Tuberculosis (pulmonary)	1
Tuberculosis (general)	1

Respectfully submitted.

MARGARET S. HALLECK,

Resident Physician.

TENTH ANNUAL REPORT

OF THE

BOARD OF MANAGERS

OF THE

Western House of Refuge for Women.

FOR THE

YEAR ENDING SEPTEMBER 30, 1903.

TRANSMITTED TO THE LEGISLATURE JANUARY 15, 1904.

ALBANY
OLIVER A. QUAYLE
STATE LEGISLATIVE PRINTER
1904

OFFICERS.

BOARD OF MANAGERS.

ETTA ELSNER FALKER	Syracuse, N. Y.
PHOEBE A. SPRAGUE, M. D	Holley, N. Y.
JOHN J. HYNES	Buffalo, N. Y.
NORMAN H. STAFFORD	Canastota, N. Y.
FREDERIC ALMY	Buffalo, N. Y.
ORVILLE H. TAYLOR	Albion, N. Y.

OFFICERS.

JOHN J. HYNES	President.
FREDERIC ALMY	Secretary.
NORMAN H. STAFFORD	Treasurer.
ALICE E. CURTIN	Superintendent.

ADMINISTRATION.

ALICE E. CURTIN	Superintendent.
SARA J. ALLEN	Assistant Superintendent.
WILLIAM G. YATES	Coachman.
ANNA R. MELDRUM	Stenographer and Bookkeeper.

FINANCE.

MINNIE E. DOTY	Book and Store Keeper.

SUPERVISION.

MARGARET MELDRUM	Prison Matron.
HELEN LA DUKE	Matron.
ALICE J. BURBANK	Matron.
ANNIE T. HILL	Matron.
MARY L. McSHEA	Matron.

ELIZABETH WALDEN	First Assistant Matron.
JULIA K. CHAMBERLAIN	Assistant Matron.
JULIA L. CARROLL	Assistant Matron.
ABBIE M. TWITCHELL	Assistant Matron.
LINDA E. OSBORNE	Assistant Matron.
MARY E. CONNER	Housekeeper.
KATE E. KEARNEY	Housekeeper and Cook.
MARTHA C. SHARDLOW	Instructor Laundry.

ENGINEERING.

EUGENE MAHONEY	Engineer and Electrician.
ANDREW VANDELL	Fireman.
ALBERT RAYMOND	Fireman.

SCHOLASTIC.

CHARLOTTE E. BASCOM	Head Teacher and Music.

INDUSTRIAL.

ISABELLA O. TYLER	Instructor Sewing.

MEDICAL.

HARRIETT N. WATSON	Physician.
IDA V. HAINES	Hospital Matron.

FARM AND GARDEN.

PATRICK SULLIVAN	Gardener.
ALFRED F. LITTLE	Laborer.

BUILDING AND REPAIRS.

CHARLES W. KINNEY	Carpenter.

STATE OF NEW YORK

No. 19.

IN ASSEMBLY.

JANUARY 15, 1904.

ANNUAL REPORT

OF THE

Western House of Refuge for Women.

ALBION, *November* 4, 1903.

To the Honorable the Legislature of the State of New York:

The board of managers of the Western House of Refuge for Women at Albion herewith respectfully presents its tenth annual report.

The following estimate of the requirements of the institution is submitted:

APPROPRIATIONS FOR 1904.

General maintenance	$35,000
Chapel and assembly hall, with high basement for gymnasium	16,500
For lighting equipment	2,500
Carriage and robes	300
Books for the library	200
	$54,500

The board did not last year ask an appropriation for a new assembly hall and chapel, although in its report it strongly urged the need of such a building. We feel now that such a building can not be longer delayed with any justice to an institution which has shown ten years of successful work. The small room used for chapel and assembly hall, gymnasium, theater, visiting room, etc., was formerly only a storeroom, and was long ago outgrown. It is greatly needed for use as an additional school room in order that the present inadequate accommodations for school may be promptly corrected.

This alone is most important, but the board also feels that the need of a chapel in a reformatory for girls is so obvious that to omit it longer would be a serious matter. It is familiar that young women even more than young men are susceptible to religious influences, and to neglect, or not properly to provide, for such influence in a place where the chief aim is to build character is a serious mistake. So important an instrument in reformation should have every consideration. We repeat the saying of Mr. Scott, formerly of the Concord Reformatory and recently appointed superintendent at Elmira: "When a godless life brings men to prison, a godless prison will do little toward their reformation." Since 1896 the board has urged the erection of such a building, but other needs have been given earlier place. Today the board puts by other serious and pressing needs in order that nothing may interfere with the early erection of a suitable chapel and assembly hall.

A paper read at the first New York State Conference of Charities said of girls committed to reformatories: "The first thing to try to do, the only thing that can really save them, is to help them to develop their souls; to teach them that physical good and ill are as nothing, and that spiritual good and ill are what human beings should care about; to convert them, to make them take an entirely different view of life, of themselves and of the world—in a word, to give them religion. That, of course, is a difficult task; but there is no other way to reform them."

At the second State Conference of Charities the fact was deprecated that services often have to be held in rooms intended for theatrical performances, or for dances.

The assembly hall and chapel should have a high basement which could be used for an indoor gymnasium. The reformatory is fairly well supplied with apparatus for exercise, but in winter it is idle for lack of a suitable indoor place. The value of exercise and relaxation in reformatory work has long been recognized.

There is also great need of a new cottage on account of the increase in population. The present overcrowding and the undesirable number of girls in the refuge building impair good work, but the board feels that its request this year for a new cottage might embarrass the greater need for an assembly hall and chapel. Both buildings are wanted, but the cottage building is less indispensable than the other.

At the time of our last report there was one vacancy on the board. This has now been filled, and two additional vacancies caused by the resignation of Hon. Francis H. Gates, of Chittenango, after his election to the State Senate, and by the resignation later of Mr. William J. Sterritt, of Middleport, have also been filled. The three new members are Dr. Phoebe A. Sprague, of Holley, and Mr. Norman Stafford, of Canastota, who took office in March, 1903, and Mr. Orville H. Taylor, of Albion, who was appointed August 25, 1903. The resignation of Mr. William J. Sterritt as president on July 1, 1903, deprives the board of a most valuable executive who served as president with unfailing devotion from his appointment to the board in January, 1900, for three and one-half years. The reformatory owes much to his sagacity, his conscientiousness and his steadfast support. At a meeting July 1, 1903, Mr. John J. Hynes, of Buffalo, was elected president in place of Mr. Sterritt.

The resignation of the steward, presented March 6, 1903, left a vacancy which, at the request of the Fiscal Supervisor of Charities, has not been filled.

During the past year the refuge building has been equipped with an outside fire-escape, and also with a door locking device in order that in case of fire the rooms may all be unlocked at once instead of one by one as would formerly have been necessary. This will very considerably lessen the danger in case of fire. In the cottages, which are two-story buildings only, a simple arrangement has been put into effect by which the gratings at the end of the corridors on the second floor are put on hinges, so that they can be opened from within by the matron who sleeps on this floor. For two-story buildings nothing more than this seemed necessary.

The school work is as good as could be expected with but one teacher and but one schoolroom. The appointment of an additional teacher is gratifying, and the release of the present assembly room for school purposes, as recomended, would still further improve this most important side of reformatory work. The gardens also have been enlarged and are now beautiful. They are a delight to the girls and an influence for good.

The new superintendent has in every way justified the action of the board in appointing her as Mrs. Boyd's successor. The work so well built up by Mrs. Boyd has been developed and improved by Miss Curtin and the board takes pleasure in expressing its belief that, thanks to both, there is no better reformatory for women in America. The institutional aspect is everywhere in the background, and the human sympathies of the girls are considered. Pleasure and happiness are associated with their life at the reformatory, as well as improvement, and the whole place resembles a girls' boarding school more than a penal institution, and is not more rigid in its discipline than a good military school.

Respectfully submitted.

JOHN J. HYNES.
FREDERIC ALMY.
ETTA ELSNER FALKER.
PHOEBE A. SPRAGUE, M. D.
ORVILLE H. TAYLOR.
NORMAN STAFFORD.

Treasurer's Report.

FOR THE YEAR ENDING SEPTEMBER 30, 1903.

Receipts.

1902.		
Oct. 1.	Balance on hand	$736 37
	Received from State Treasurer, general	33,300 00
	Received from State Treasurer, special	4,374 38
	Sales of farm produce	16 00
	Home product	885 35
	Total	$39,312 10

Disbursements.

Ordinary expenditures:

Salaries of officers	$14,669 72
Expenses of managers	509 51
Provisions	5,473 37
Household stores	732 13
Clothing	1,113 86
Fuel and light	7,028 90
Hospital and medical	196 11
Shop, farm and garden	1,252 33
Transportation of inmates	591 05
Miscellaneous	1,948 88
Total	$33,515 86

1902.	Extraordinary expenditures:	
Oct. 1.	Locking device	$1,863 00
	Conduit and steam plant	2,094 74
	Spray baths	416 64
	Total	$4,374 38

Recapitulation.

Ordinary expenditures	$33,515 86
Extraordinary expenditures	4,374 38
Home product (consumed)	885 35
Sales of farm produce, returned to State Treasurer	16 00
Balance in hands of the superintendent	100 00
Balance in local bank	420 51
Total	$39,312 10

Respectfully submitted.

N. STAFFORD,
Treasurer.

Superintendent's Report.

To the Honorable the Board of Managers:

I herewith submit the tenth annual report of the Western House of Refuge for Women.

STATISTICAL TABLES.

TABLE NO. 1.

Showing movement of population:

Number in institution October 1, 1902	118
Number received during the year	70
Number returned from parole	1
Number returned voluntarily	1
Number infants born	4
Number discharged and paroled	56
Number discharged by courts	2
Number infants died	2
Number remaining September 30, 1903	134
Total number new commitments	445
Total number infants born	23

TABLE NO. 2.

Showing the number of girls received during the fiscal year and from what courts:

Police court	44
Justices' court	9
Recorders' court	16
City court	1
Total	70

TABLE NO. 3.

Showing for what offense committed:

Petit larceny	10
Public intoxication	7
Immorality	38
Disorderly conduct and immorality	2
Frequenting disorderly houses	7
Habitual drunkenness	3
Keeping disorderly house	1
Disorderly conduct	1
Vagrant	1
Total	70

TABLE NO. 4.

Showing from whence received:

Broome county	7
Cattaraugus county	4
Cayuga county	5
Chautauqua county	3
Chemung county	3
Chenango county	3
Erie county	12
Genesee county	4
Madison county	1
Monroe county	15
Niagara county	5
Orleans county	1
Schuyler county	1
Steuben county	2

Tioga county	3
Tompkins county	1
Total	70

TABLE NO. 5.

Showing occupation of girls received:

Bakery	1
Bean sorter	1
Box factory	1
Canning factory	1
Cigar maker	1
Clerk	1
Domestic	26
Living at home	2
Manicurist and hair dresser	1
No occupation	26
Restaurant	1
Saloon	1
Silk mill	1
Shoe shop	2
Waitress	2
Woolen mill	2
Total	70

TABLE NO. 6.

Showing ages of girls received:

Fifteen years	6
Sixteen years	12
Seventeen years	14

Eighteen years	11
Nineteen years	10
Twenty years	3
Twenty-one years	8
Twenty-two years	1
Twenty-four years	1
Twenty-five years	3
Twenty-seven years	1
Total	70

TABLE NO. 7.

Showing religious denominations:

Protestant	53
Catholic	17
Total	70

TABLE NO. 8.

Showing social relations:

Unmarried	56
Married	13
Widow	1
Mothers	10
Total	70

TABLE NO. 9.

Showing nationalities:

American born	57
Canadian born	10
German born	1

French born	1
Russian born	1
Total	70

TABLE NO. 10.

Showing nationalities of parents:

American	67
Canadian	21
German	15
Irish	11
Russian	2
English	6
Scotch	4
French	4
Swedish	2
Not known	8

Seventy girls were committed to the institution during the fiscal year ending September 30, 1903, against 50 in 1902 and 38 in 1901. On October 1, 1902, we counted 118; to-day, including children, we have 134, with 22 out on parole. The population is divided as follows: 22 in each of four cottages and 46 in the reception building.

Heretofore, with our smaller numbers, we have been able to attain a fair classification; now, no matter how desirable to promote a girl immediately to a cottage, it is impossible to do so; she must wait until such a time as a vacancy occurs. The need, therefore, of another cottage forces itself upon our consideration. This building should make provision for 30 girls, as this number can be cared for with the same facility and about the same expense as can 20. It should contain an office for the use of the supervisors, the only room now available being the matron's private room. The girls' sitting room should be on the first floor and the space devoted to this purpose in the present cottages should be used for sleeping rooms. Without question a building of this description would aid greatly in grading and classification, and prevent in the reception cottage a crowded condition, which will certainly be the result should our numbers increase in the coming year as they have in the past.

But a building absolutely necessary to the good management and moral influence of the institution is one that can combine within its walls a chapel and gymnasium—that is, a one-story building with high basement, the latter furnishing sufficient room for physical exercises. From time to time in past reports a desire for a chapel has been expressed by the board of managers, by the superintendent, by the ministers who conduct the services; to-day it is not something we would like to have, it is a positive necessity.

In an assembly room formerly used as a storehouse, we hold our Sunday services, on school days conduct the singing and physical culture lessons, and on holidays the room is cleared and it is here we enjoy our social gatherings. Here, also, are all entertainments presented, and the girls receive their friends on visiting days. All this is not in keeping with the sacredness with which a chapel should be invested. But without any regard to the fitness of things, the accommodations are altogether too small. Under the same roof a crowded condition exists in regard to the school and sewing classes, and in the event of a new chapel the old assembly could be divided, one half affording recitation room, the other supplying ample accommodations for the industrial department.

There are those who scoff at the idea of making much of the religious element in what may be called the science of reform in these institutions; but the various clergymen who give their services Sunday after Sunday, the Sunday-school teachers who are most faithful in the discharge of their duties, will bear us out in the statement that their congregation is respectful, attentive, often even eager for the message which may mean to them their future salvation. We are confident that the honorable body to whom this report is submitted and who have the best interests of the wards of the State at heart, appreciaing the amount of good to be accomplished, will most willinglly provide for this our great and crying need.

Very little change has been made in the plan of work in school. Four grades assemble in the morning, numbering 40 pupils. Many of these can not read words above one syllable and fully one-third find it difficult to write a letter. Taking out the time devoted to physical culture and singing exercises, the morning is all too short to bring about satisfactory results.

Again, in the afternoon two and sometimes three grades are taught. Between 35 and 40 comprise this session. The assembly room being too small to accommodate all the pupils at one time, the same program of physical culture and singing is followed. The grades in the afternoon are more advanced and do not require so much attention as those attending the morning school, where the work of necessity is largely individual. Notwithstanding the many drawbacks, a keen interest is manifested in the school, and promotions are frequent and rapid.

The employment of another teacher will greatly aid in the advancement of the school, and also be the means of carrying out a long cherished project, that of establishing a preparatory school at the reception cottage.

There have been some changes in the general character of the institution during the past year, relating mostly to improvements. Two porcelain bathtubs were placed in the hospital, and kitchen and porches painted. The cellars underneath all the buildings were whitewashed. The kitchen doors on the four cottages were changed to open into instead of away from the court. This has not only been a convenience, but added greatly to the warmth and comfort of the kitchens. The engineer and carpenter have, at a nominal expense, painted several of the roofs, the frost interrupting the work, which will be taken up again in the spring. The cottage kitchens, pantries, dining and sitting rooms have also received their coat of paint, the dark reds and greens giving an added touch to the already homelike appearance of these buildings.

During the summer months extensive repairs were made on the steam boilers, all three receiving the first general overhauling in ten years. An unusual amount of work was laid out on the grounds, beautifying and improving lawns, roads and gardens. The cottage gardens doubled the space allotted to them last year, and enthusiasm ran high over the work. Not only were they a thing of beauty, but the practical side was duly appreciated, when all the families reveled in fresh vegetables. That the moral effect on the workers is wholesome goes without saying. In the general garden there was no lack of summer vegetables, though owing to weather conditions the winter vegetables were something of a failure. This was fully compensated for by the abundance of apples which the orchard yielded. Fifteen hundred new strawberry plants give a promise of a rich harvest the coming year.

The model class was something of an experiment last year, and although the work has become rather difficult for one instructor, its success is established. Five mornings in the week have been given to the model sewing, the afternoons and Saturday being devoted to the making and mending. The arrangement of the classes is such that each girl gets the benefit of three months in the model class and then she is well prepared to make a helpful assistant in the regular sewing department.

A pleasant feature of the vacation was the establishing of two summer schools, one in drawing and composition and the other in basketry. This was made possible through the kindness of two personal friends. Such has been the enthusiasm in basket making that we hope to make it one of the features of the industrial department.

Although the laundry, sewing and housekeeping departments are taxed to their utmost, everything is so well systematized that much time is given to outdoor exercise and amusements. We are well provided with games, and it is no exaggeration to say that any one who visits the institution will see nothing of the prison aspect, little that denotes a reformatory and much that suggests a happy schoolgirl life.

The watchword in these days is cooperation, and nowhere is the term better exemplified than among us. The degree of comfort and happiness which we experience is not dependent on any hard-and-fast rules, but lies in the strength of our union, the general disposition on the part of both the officers and their charges to work with and uphold the management in the desire to promote the welfare of the institution.

During the year we have had many calls from the various commissions and associations throughout the State, some to instruct, some to inspect, all to extend a friendly and helpful hand, for which courtesies we are very grateful.

And lastly, to our own board, who, through every trial, have given generously of their help and encouragement, do we extend our sincere expression of appreciation.

Respectfully submitted.

ALICE E. CURTIN,
Superintendent.

Physician's Report.

I have the honor to present the tenth annual report of the medical work of the Western House of Refuge for Women.

Though it is to be expected among such a class there is at all times considerable illness and many diseases to be treated, there has been no prevailing epidemic in the institution during the year. Four children have been born, two of whom died soon after birth. There has been no other death.

DISEASES TREATED DURING THE YEAR.

Abscesses, alveola.
Abscesses, axilla.
Abscesses of ear.
Abscesses of labia.
Acne.
Alcoholism.
Amenorrhea.
Anaemia.
Amygdalitis.
Anthrax.
Angina pectoris.
Asthma, bronchial.
Asthma, cardiac.
Bilious attack.
Bronchitis.
Bright's disease, acute.
Bubo.

Bunion.
Burns of arms.
Burns of leg.
Burns of hands.
Catarrh, gastric.
Catarrh, nasal.
Cholera infantum.
Chancroid.
Chorea.
Cigarette habit.
Conjunctivitus.
Constipation.
Convulsions, epileptic.
Convulsions, hysterical.
Convulsions, uraemic.
Coryza.
Croup, membranous.
Cystitus.
Debility.
Delirium.
Dislocations.
Diarrhea.
Dysmenorrhea.
Dysentery.
Dyspepsia.
Eczema.
Enteritis.
Enuresia.
Epilepsy.

Erysipelas.

Eye strain.

Eye, foreign body in.

Fever, bilious.

Fever, malarial.

Fever, rheumatic.

Fever, typhoid.

Fever, simplex.

Feruncle.

Gall stones.

Goitre.

Gonorrhea.

Haematuria.

Haematemesis.

Haemoptysis.

Hemorrhage of bowels.

Hemorrhage, post portum.

Hemorrhoids.

Hernia.

Hives.

Hydatid pregnancy.

Hysteria.

Ingrowing toe nail.

Influenza.

Insomnia.

Iritis.

Laryngitis.

Lumbago.

Migraine.

Miscarriage.
Metrorrhagia.
Neuralgia.
Nephritis.
Opium habit.
Overitis.
Pediculosis.
Phornygitis.
Pleurisy.
Pleurodeny.
Quinsy.
Rheumatism, acute articular.
Rheumatism, gonorrheal.
Rheumatism, muscular.
Rheumatism, inflammatory.
Scalp, disease of.
Sprain of ankle.
Sprain of knee.
Sprain of wrist.
Stiff neck.
Syphilis.
Ulcers, gastric.
Ulcers of leg.
Ulcers of mouth.
Ulcers of vulva.
Ulcer of uterus.
Vaginitis.
Varicose veins.
Whitlow.

Wounds, punctured and lacerated hands.

Wounds, fingers and feet.

Wounds, incised, of hand.

Wounds, contused, of face and head.

Worms.

Respectfully submitted.

HARRIET M. WATSON,
Attending Physician.

CHAPTER 632, LAWS OF 1889.

AN ACT to amend chapter five hundred and forty-six of the laws of eighteen hundred and ninety-six, entitled "An act relating to state charities, constituting chapter twenty-six of the general laws," relating to commitments to houses of refuge and reformatories for women.

Became a law, May 23, 1899, with the approval of the Governor. Passed, three-fifths being present.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

Section 1. Section one hundred and forty-six of chapter five hundred and forty-six of the laws of eighteen hundred and ninety-six, is hereby amended so as to read as follows:

§ 146. Commitments; papers furnished by the committing magistrates.

Subdivision 1. A female between the ages of fifteen and thirty years, convicted by any magistrate, of petit larceny, habitual drunkenness, of being a common prostitute, of frequenting disorderly houses or houses of prostitution, or of a misdemeanor and who is not insane, nor mentally or physically incapable of being substantially benefited by the discipline of either of such institutions, may be sentenced and committed to the House of Refuge for Women, at Hudson, or to the Western House of Refuge for Women, at Albion, or to the New York State Reformatory for Women, at Bedford. The term of such sentence and commitment shall be three years, but such female may be sooner discharged therefrom by the board of managers. Such commitments to the House of Refuge for Women, at Hudson, until the New York State Reformatory for Women, at Bedford, is completed and ready for the reception of inmates, shall be from the first, second, third, fourth and fifth judicial districts, and the counties of Delaware and Otsego; to the Western House of Refuge for Women, at Albion, from the other counties in the sixth and from the seventh and eighth judicial districts. On the completion of the New York State Reformatory for Women, at Bedford, commitments shall thereto be made from the first judicial district and the counties of Kings, Queens, Nassau, Suffolk, Richmond and Westchester.

2. The board of managers of each institution shall furnish the several county clerks of the state with suitable blanks for the commitment of women thereto. Such county clerks shall immediately notify the magistrates of their respective counties of the reception of such blanks, and that upon application they will be furnished them.

3. The magistrate committing a female pursuant to this section shall immediately notify the superintendent of the institution to which the commitment is made, of the conviction of such females, and shall cause a record to be kept of the name, age, birthplace, occupation, previous commitments, if any, and for what offenses; the last place of residence of such female, and the particulars of the offense for which she is committed. A copy of such record shall be transmitted, with the warrant of commitment, to the superintendent of such institution, who shall cause the facts stated therein, and such other facts as may be directed by the board of managers, to be entered in a book of records.

4. Such magistrate shall, before committing any such female, inquire into and determine the age of such female at the time of commitment, and her age as so determined, shall be stated in the warrant. The statement of age of such female in such warrant shall be conclusive evidence as to age, in any action to recover damages for her retention or imprisonment under such warrant, and shall be presumptive evidence thereof in any other inquiry, action or proceeding relating to such detention or imprisonment.

§ 147. Return of female improperly committed.—Whenever it shall appear to the satisfaction of the board of managers of any such institution that any person committed thereto is not of the proper age to be committed, or is not properly committed, or is insane or mentally incapable of being materially benefited by the discipline of such institution, such board of managers shall cause the return of such female to the county from which she was committed. Such female shall be so returned in the custody of one of the persons employed by such board of managers to convey to such institution women committed thereto, who shall deliver her into the custody of the sheriff of the county from which she was committed. Such sheriff shall take such female before the magistrate making the commitment, or some other magistrate having equal jurisdiction in such county, to be by such magistrate resentenced for the offense for which she was committed to such institution, and dealt with in all respects as though she had not been committed. The costs and expenses of the return of such female necessarily incurred and paid by such board of managers shall be a charge against the county from which such female was committed, and to be paid by such county to such board of managers in the same manner as other charges are collected.

§ 148. Disposition of children of women so committed.—If any woman committed to such institution at any time of such commitment is a mother of a nursing child in her care under one year of age, or is pregnant with child which shall be born after such commitment, such child may accompany its mother to and remain in such institution until it is two years of age, and must then be removed therefrom. The board of managers of such institution may cause such child to be placed in any asylum for children in this state and pay for the care and maintenance of such child therein at a rate not to exceed two and one-half dollars a week, until the mother of such child shall have been discharged from such institution, or may commit such child to the care and custody of some relative or proper person willing to assume such care. If such woman at the time of such commitment shall be the mother of and have under her exclusive care a child more than one year of age, which might otherwise be left without proper care or guardianship, the magistrate committing such woman shall cause such child to be committed to such asylum as may be provided by law for such purposes, or to the care and custody of some relative or proper person willing to assume such care.

§ 149. Conveyance of women committed.—The board of managers of such institution shall employ suitable persons to be known as marshals to convey from place of conviction to such institution all women legally committed thereto, and such marshals shall have the power and authority of deputy sheriffs in respect thereto. All expenses necessarily incurred in making such conveyance shall be paid by the treasurer of the board of managers. In case of the commitment of a woman who, at the time thereof is the mother of a nursing child or is pregnant, the board of managers shall designate a woman of suitable age and character to accompany the person committed, along with the officer or representative authorized in this section to be employed by such managers.

§ 150. Detentions and re-arrests in cases of escape.—The board of managers of such institution may detain therein, under the rules and regulations adopted by them any female legally committed thereto, according to the terms of the sentence and commitment, and conditionally discharge such female at any time prior to the expiration of the term of commitment. If any inmate escapes or be conditionally discharged from such institution the board of managers may cause her to be re-arrested and returned to such institution, to be detained therein for the unexpired portion of her term dating from the time of her escape or conditional discharge. A person employed by the board of managers of such institution to convey to such institution women committed thereto, may arrest, without warrant, an escaped inmate in any county in this state and shall forthwith convey her to the institution from which she escaped; and a magistrate may cause an escaped inmate to be arrested and held in custody until she can be removed to such institution, as in the case of her first commitment thereto. A person conditionally discharged from such institution may be arrested and returned thereto upon a warrant issued by its president and secretary. Such warrant shall briefly state the reason for such arrest and return, and shall be directed and delivered to a person employed by such board of managers to convey to such institution women committed, and may be executed by such person in any county of this state.

§ 151. Employment of inmates.—The board of managers of such institution shall determine the kind of employment for women committed thereto and shall provide for their necessary custody and superintendence. The provisions for the safe keeping and employment of such women shall be made for the purpose of teaching such women a useful trade or profession and improving their mental and moral condition. To secure the safe keeping, obedience and good order of the women committed to any such institution, the superintendent thereto has the same power as to such women, as keepers of jails and penitentiaries possess as to persons committed to their custody.

§ 2. This act shall take effect immediately.

NINETEENTH ANNUAL REPORT

OF THE

MANAGERS

OF THE

STATE CUSTODIAL ASYLUM
FOR FEEBLE-MINDED WOMEN

NEWARK, N. Y.

YEAR ENDING SEPTEMBER 30, 1903

TRANSMITTED TO THE LEGISLATURE JANUARY 18, 1904

ALBANY
OLIVER A. QUAYLE
STATE LEGISLATIVE PRINTER
1904

BOARD OF MANAGERS

CHARLES McLOUTH, President,	Palmyra, N. Y.,	1909
EDWIN K. BURNHAM, Treasurer	Newark, N. Y.,	1907
ELLERY G. ALLEN, Secretary	Farmington, N. Y.,	1907
GEORGE O. BAKER	Clyde, N. Y.,	1909
GERTRUDE A. MOSS	Rochester, N. Y.,	1909
RICHARD P. GROAT	Newark, N. Y.,	1905
AUGUSTA H. BEACH	Syracuse, N. Y.,	1905
NELLIE R. HOTCHKISS	Lyons, N. Y.,	1907
W. FRANK MARKS	Chapinville, N. Y.,	1905

EXECUTIVE COMMITTEE

CHARLES McLOUTH, *Chairman.*

R. P. GROAT, GEORGE O. BAKER,
E. K. BURNHAM, E. G. ALLEN.

OFFICERS AND EMPLOYEES

No.	NAME.	Occupation.	Residence.	Date of Appointment.	Rate Per Month.
1.	C. W. Winspear	Superintendent	Newark	July 1, 1893	$208 33
2.	Belle R. Norton	Chief clerk	Macedon	Nov. 1, 1894	50 00
3.	Isaac Delizery	Coachman	Newark	Apr. 1, 1903	45 00
4.	C. Belle Cornell	Stenographer	Middleb'g	Feb. 2, 1901	30 00
5.	Gertrude G. Lally	Bookkeeper	Newark	Mch. 1, 1902	30 00
6.	Anna T. Dugan	Junior clerk	Bingh'ton	Mch. 24, 1902	20 00
7.	Kate J .Rehklau	Storekeeper	Newark	Oct. 1, 1894	45 00
8.	Nina Havert	Attendant	Zurich	Feb. 1, 1903	14 00
9.	Mary A. Walsh	Attendant	Palmyra		
10.	Pearl E. Lape	Attendant	Sodus	Sept. 15, 1902	16 00
11.	Bertha E. Mestler	Attendant	Lyons	June 1, 1903	14 00
12.	Edna Acker	Attendant	Wolcott	Apr. 1, 1902	16 00
13.	Adah Phillips	Attendant	Newark	Jan. 29, 1897	18 00
14.	Mabel Johnson	Attendant	Fairport	May 1, 1902	16 00
15.	Elizabeth M. Pilcher	Attendant	Lyons	Sept. 2, 1903	14 00
16.	Nellie J. Tucker	Attendant	Lyons	Sept. 23, 1903	14 00
17.	Marion Tucker	Attendant	Lyons	Oct. 1, 1903	14 00
18.	Nora McCarthy	Attendant	Lyons	June 17, 1903	14 00
19.	Anna E. Proseus	Attendant	Lyons	Nov. 27, 1900	18 00
20.	Bertha H. Jennick	Attendant	Rochester	Apr. 26, 1900	18 00
21.	Elizabeth Crowe	Attendant	Phelps	Dec. 31, 1900	18 00
22.	Bertha E. Mestler	Attendant	Lyons		
23.	Edith E. Hermans	Attendant	Lyons		16 00
24.	I. Gertrude Bear	Attendant	Lyons		14 00
25.	Ella Dutcher	Attendant	Geneva	Nov. 3, 1903	14 00
26.	Jennie L. Davis	Attendant	Lyons	Mch. 1, 1902	16 00
27.	Lottie Connor	Attendant	Fairport	Oct. 11, 1901	18 00
28.	Irva A. Smith	Attendant	Newark	May 1, 1898	18 00
29.	Georgiana Leyere	Attendant	Clayton	Aug. 19, 1902	16 00
30.	Mary Cosgrove	Attendant	Clift'n Spgs.	Aug. 5, 1901	18 00
31.	Caroline L. Pilcher	Attendant	Lyons	Mch. 23, 1901	18 00
32.	Alice G. O'Neil	Attendant	Newark	Dec. 1, 1902	16 00
33.	Sarah H. Hoftalling	Attendant	Palmyra	May 30, 1900	18 00
34.	Julia A. Maney	Attendant	Can'd'gua	Nov. 13, 1902	16 00
35.	Sarah Irwin	Night attendant	Newark	Sept. 1, 1894	20 00
36.	Emma Tucker	Night attendant	Newark	Aug. 20, 1900	20 00
37.	Alderett E. Goodell	Night attendant	Holley	Nov. 20, 1895	20 00
38.	Lodicie E. Smith	Night attendant	Newark	Jan. 1, 1900	20 00
39.	H. Pauline Gifford	Night attendant	Newark	Aug. 13, 1902	18 00
40.	Lottie Ferrick	Night attendant	Newark	Sept. 1, 1903	16 00
41.	Gertrude E. Winspear	Matron	Newark	July 1, 1893	75 00

No.	NAME.	Occupation.	Residence.	Date of Appointment.	Rate Per Month.
42.	Mary E. Kennedy	Asst. matron, Bldg. "A"	Camden	Sept. 23, 1903	$25 00
43.	Alice Davis	Asst. matron, Bldg. "B"	Newark	Feb. 3, 1900	25 00
44.	Nellie Engels	Asst. matron, Bldg. "C"	Newark	Oct. 4, 1902	25 00
45.	Bessie Lynch	Asst. matron, Bldg. "D"	Utica	Feb. 7, 1901	25 00
46.	Helen D. Morgan	Asst. matron, Bldg. "E"	Utica	Nov. 11, 1901	25 00
47.	Caroline B. Power	Asst. matron, Bldg. "F"	Palmyra	Dec. 1, 1902	25 00
48.	Grover H. Woods	Engineer	Newark	Apr. 8, 1902	85 00
49.	W. O. Breese	Fireman	Newark	Oct. 17, 1899	45 00
50.	Fred. Greule	Fireman	Newark	Aug. 14, 1902	45 00
51.	Frances L. Helmer	Teacher	Almond	Nov. 23, 1903	30 00
52.	Emma Mentz	Instructor in sewing	Newark	Dec. 15, 1900	30 00
53.	Jessie Silliman	Instructor in sewing	Wolcott	Feb. 1, 1898	30 00
54.	Nellie Addicott	Seamstress	Palmyra	June 2, 1900	16 00
55.		Seamstress			
56.	Inez Klingensmith	Day nurse	Buffalo	Oct. 27, 1901	25 00
57.	Inez Tolsma	Night nurse	Buffalo	Dec. 31, 1901	25 00
58.	Anna Warnecke	Physician	New York	Jan. 3, 1902	83 34
59.	Cora Williams	Cook	Marion	June 1, 1899	20 00
60.	Grace Williams	Cook	Lyons	May 1, 1902	17 00
61.	Joanna Lally	Cook	Newark	July 25, 1900	20 00
62.	Amelia S. Walter	Cook	Lyons	Feb. 26, 1900	20 00
63.	Martha Mooney	Cook	Rochester	Oct. 10, 1901	20 00
64.	Jeannette L. B. Peck	Cook	Spencerp't	Nov. 17, 1903	15 00
65.	Anna McDonnell	Baker	Buffalo	May 1, 1902	35 00
66.	Margaret Oulahan	Laundress	Newark	May 9, 1902	14 00
67.	Catherine Oulahan	Laundress	Newark	Oct. 25, 1903	12 00
68.	Teresa Oulahan	Laundress	Newark	Dec. 22, 1901	14 00
69.	Nora O'Neil	Laundress	Lyons	Feb. 1, 1903	12 00
70.	Thomas P. Barnes	Gardener	Newark	Nov. 9, 1903	50 00
71.	Fred Rentschler	Teamster	Newark	May 1, 1903	30 00
72.	Leland P. Stauring	Laborer	Newark	Apr. 22, 1899	35 00
73.	Adrian Fagner	Laborer	Newark	Apr. 1, 1901	35 00

STATE OF NEW YORK

No. 20.

IN ASSEMBLY,

JANUARY 18, 1904.

NINETEENTH ANNUAL REPORT

OF THE

Managers of the State Custodial Asylum for Feeble-Minded Women

FOR THE YEAR ENDING SEPTEMBER 30, 1903

To the Honorable the Legislature of the State of New York:

The managers of the State Custodial Asylum for Feeble-Minded Women at Newark, N. Y., have the honor to report:

That during the year covered by this report the health of this institution has been good to a remarkable degree, as is shown by the report of the resident physician hereto attached. It is doubtful if in any community of the State, of a like population, an instance could be found where only two deaths have occurred in a year.

September 30, 1902, the population of this institution was 465. The end of the fiscal year, September 30, 1903, finds, of inmates, 513, an increase of 48.

The fact stated furnishes alike a commentary upon the location, the care, the superintendence, and the faithfulness of officials and attendants.

The annual inventory filed October 1, 1903, shows of personal property, $32,318.93, and of real, $274,125.03, an increase over last year of $32,512.44.

The Superintendent's report shows that the weekly per capita has been $2.263.

The Treasurer's report shows that the total expenditures for maintenance has been $58,084.86, leaving an unexpended balance of moneys available for the year of $1,441.75; which last amount is carried into the account for the year 1903-4.

Considering together the population, the health, the per capita, and the expenditures, we claim for this institution and its management the first rank in the state.

The following abstracts from the annual report of the Superintendent, the Treasurer, and the Resident Physician, will detail the foregoing statements.

A list of the names of managers, their residence, the expiration of their terms, together with the officers of the board, and the executive committee, and also of all employees and the dates of their appointment, with monthly salaries, is hereto prefixed.

The report of the Superintendent shows that there were

present October 1, 1902	465
Admitted during the year	71
Total	536

Discharged during the year	19	
Died during the year	2	21
Present October 1, 1903		515
Salaries of officers and employees		$25,077 93
Expenses of managers	$200 34	
Expenses of Superintendent and matron	173 71	374 05
Cost of provisions		15,227 02
Expended on account of special appropriations:		
Extraordinary repairs, grading, etc		$26 00
Repairs and betterments		117 80
Removal of old buildings and grading		80 73
Development of water supply		38 45
Drainage		443 83
Flooring		430 67
New boiler and connections		483 28
New cottage dormitory "F"		7,244 33
Sewage disposal plant and land		185 39
Retaining wall		299 90
Walk and roads		78 30
Roads and grading		132 36
Furnishing cottage "F"		2,873 96
Pianos		500 00
Dormitory E		936 27
Electric light		421 69
Fire escape		1,194 04
Repairs and equipment		123 71
Cement walk and sewer		209 05

The age of the inmates varies from 15 to 45 and over.

There are in the institution inmates from fifty-nine counties of the State varying from one in each of the counties of Nassau, Putnam and Seneca, to ninety-eight in the county of New York.

Twelve thousand eight hundred and ninety articles of woman's apparel and household use have been manufactured by the inmates in the sewing department.

The farm products raised and used in the institution at the fair local market value reached $2,147.27.

Various improvements have been made. Cottage dormitory F. completed and occupied by about 60 inmates.

The workings of the steam and lighting plant have been satisfactory.

In reference to the installation of a thorough water plant and an effective sewage disposal, there has been more or less progress made, and the State officers are working in conjunction with the managers to effect the same.

The Treasurer's report shows that there was on October 1, 1902, a balance in hand of $601.61, and that through the year there has been received from the State treasury, on monthly estimates, $58,625, making a total of $59,226.51.

That disbursements have been made as follows:

Disbursements.

Salaries of officers and employees	$25,077 93
Expenses of Managers, etc	374 05
Board of Managers	200 34
Superintendent and matron	173 71
Provisions	15,227 02
Household stores	2,565 48

Clothing	$2,301 00
Fuel and light	6,390 08
Hospital and medical supplies	773 63
Shop, farm and garden	2,150 39
Ordinary repairs	269 57
Miscellaneous	2,952 71
Total	$58,084 86
Balance in the hands of our Treasurer	1,141 75
Balance in the hands of State Treasurer	300 00

The other special funds have been received and disbursed to a considerable extent, and of much detail, and that at date (October 1, 1903), of special funds there are in hands of the State Treasurer and our Treasurer, as follows:

GENERAL FUND MAINTENANCE.

(Chapter 593, Laws 1902.)

1903.			
Oct.	1.	Balance in the hands of our Treasurer	$1,141 75
		Balance in the hands of State Treasurer	300 00

MONEYS REMAINING IN STATE TREASURY.

(Special Funds, Chapter 428, Laws 1902.)

Cottage dormitory G	$32,000 00
Roads and grading	367 64
Furnishing cottage F	126 04
Dormitory E	140 38
Electric light	78 31
Fire escape	2 31

(Chapter 589, Laws 1903.)

Repairs and equipment	$1,376 29
Cement walks and sewer, cottage G	390 95
Pipe covering	500 00
Fire hose and carts	350 00
Feed water purifier and connections	1,900 00
Renovating cottage for Superintendent and family	900 00
Furnishing cottage G	3,250 00
Fire escape for cottage G	600 00

The report of the Resident Physician shows that the whole number of inmates passing through the hospital during the year was		198
Discharged	188	
Died	2	
Present October 1, 1903	8	
		198
That the whole number of inmates treated in dispensary during the year was		1,772

During the year the managers have held meetings on the first Tuesday of every month (except in November, when the meeting was held the first Wednesday), and they have carefully made, signed and forwarded as required by law, reports of inspection, conditions, etc., and made such recommendations as to them has seemed useful. With the exception of *two reports* acknowledged by the Governor, the managers have no knowledge whether such monthly reports have been received; and of the various recommendations which they have thus made, which seemed to them proper and important, to be considered or acted upon, the managers are unaware whether any consideration has been had or disposition made.

If managers are required by law to meet monthly, and to file such report—which is of some burden throughout the State to active men and women who are gratuitously doing the same—there should be some good purpose subserved by it, and whether such is the result or not, will not much appear if such reports are not accorded the consideration of at least acknowledgment.

The continued serial story of want of capacity—of crowding—and inability to receive applicants because of no room is not yet at an end. It is as pressing here as at any institution of the State, and it is likely to remain.

To a large extent it is the result, here as elsewhere, of recent legislation, which has placed all building and construction, first in the hands of the Commission, and then of the State Architect, with the cumbrous system of contracts and approval, which sends things back and forth, from hand to hand, with consequent delays, misunderstandings, and more or less cross purpose.

Doubtless the purpose of the devised system was to centralize responsibility, to hasten building, to economize expenditures, and to increase the care over the State's unfortunates, but the results have been, on the contrary, quite the reverse.

Responsibilities have been scattered. Building has been delayed. Expenditures have been increased. The care of the State's wards has been minimized, and this is not the fault of the person upon whom duties have been sought to be devolved. It is impossible for the State Architect to make expedition in the entire charge of the construction of all the State's work. No department out of reach can control the care or supervision or management of large communities with either speed or economy. Local managers cannot accelerate either work or maintenance with hands tied, and responsibility cannot safely be divided between departments and managers.

Either managers ought to be abolished absolutely, and thus relieve one or two or three hundred busy men and women from a burdensome waste of time, from large labors, and from a sense of responsibility; or else they ought to be charged with and held responsible for the management of their institutions, and the use of the State's moneys.

An object lesson is presented here. Prior to the enactment of the system in vogue, in 1893-4, we had an appropriation of $12,000 for a cottage dormitory (D.), and for equipping the same $6,750. Within a few months from available funds we had the building completed, equipped, furnished and occupied by forty-five inmates, at a cost less than $18,000. And that included the building of a conduit to heat and light the same, over 300 feet long, which we built at a cost of less than $4 per lineal foot. It is the best building, out of seven, for our use that we have on the ground.

Since these laws have been in force there have been built on our grounds two cottage dormitory buildings; one (E.) appropriated for in 1898-9-1900, to the extent of $30,000, opened October 1, 1901, and one (F.) appropriated for in 1901 to the extent of $30,000, opened December 1, 1902, either of which exhausted the appropriation, accommodating sixty inmates each. And those sums did not include the equipment.

In 1902 we had an appropriation of $30,000 for a similar cottage dormitory (G.) to accommodate sixty inmates; and with all the urgency the managers have been able to use, and without any delays upon their part, it has just passed under contract, the excavation is partly made, the work ceases for the winter, and the building will not be ready for occupation until the latter months, if at all, in 1904.

If the managers had been allowed to, and made responsible for, the building of either of these, they would have been built and occupied, and certainly one quarter of the time and money saved.

The buildings might have been less elaborate, perhaps less ornamental, but they would have been as commodious and as useful, and within every probability, by the fall of 1904 there would have been two, if not three, more cottage dormitories on our grounds than there can be now. They would have housed 120 to 180 more of the unfortunates, for whose custodial care the counties of the State are clamoring, and so much more protection would have been given to the state.

The system, works the delay.—It augments the expenses. It decrease the usefulness of the State's charities.

It is true that no law has by direct expression limited the powers of managers; but by the creation of new commissions and departments, powers have been given which have been interpreted to supercede and qualify any power which managers had, and thus to make the position subservient entirely to those given by such interpreted laws.

The people of the State and the Legislature in 1902, refused to abolish boards of managers of charitable institutions by direct laws, but it is done indirectly as recited.

We respectfully call upon the Legislature to do one of two things: *Abolish entirely local managers;* or, allow to capable and conscientious men and women *opportunity to manage* and hold them responsible therefor.

The Board of Managers of the State Custodial Asylum respectfully requests of the Legislature of 1904, the following appropriations:

For duplicating present dynamo and engine, and work attending same..........................	$2,500 00
For renewing plumbing in A, B, C and D buildings, with closets and renewals......................	2,500 00
For cistern at E cottage and extending water mains for city water to Cottage G.....................	700 00
For grading walks, roads, gutters and clothes yards.	1,000 00
For pipe covering and work attending same........	300 00
For removal and repairing of propagating houses...	500 00
For industrial and school building................	10,000 00
For sewage disposal..........................	5,000 00
For development of water supply and purchase of right of way..............................	3,000 00
For extraordinary repairs......................	2,000 00
For maintenance and ordinary repairs............	65,000 00
And the reappropriation of whatever may remain undrawn of the Cottage G, under appropriation of 1902 (for piggery destroyed by fire)..........	600 00

The Board of Managers have omitted from their requests for appropriations a sum for the building of one additional cottage Dormitory, of similar construction and cost as the E and F buildings, now in use, and the G building now in construction under the appropriation of 1902.

This is not done because the Board does not fully realize the necessity of such an appropriation, but because such a request was made in 1903 and was not allowed, and the very unanswerable statement made:

"You had an appropriation in 1902, and have not used it or made any progress toward the building. Why ask for another now?"

And the managers realized that the same answer might be made with greater force in 1904, when another year has elapsed and no building erected, nor any fractional part of the appropriation of 1902 used.

That proposition is what has so far extended this report.

We have asked and do now request the State Board of Charities and the Fiscal Supervisor, through the Legislature, to make provision for an additional cottage dormitory, and respectfully urge the Legislature to make appropriation therefor.

It has been the purpose of the State Board to erect one building each year until the institution shall have capacity for and a population of 1,000 inmates, and we trust that we present such case to the Legislature as fully warrants, in the exercise of the highest charity and the strictest economy, the fulfillment of this proposition.

The necessity of an appropriation for a duplicate dynamo is so obvious that no words are required here. The failure of the single one in use for an hour or a month, from some accident, would entirely deprive us of light; and such accidents so constantly occur, and duplicates are of so constant use from absolute necessity, that the request should be acceded to at once by the Legislature.

The vexed proposition for disposal of sewage has somewhat progressed towards solution, and we respectfully ask the Legislature to contribute its aid to the installation of such system as shall be advised by the State authorities, to the end that proper sanitation and the avoidance of disease may follow so far as human power may control.

The securing of a water system that shall, at small annual cost, furnish a suitable supply of suitable water, will complete the circle that makes this the most satisfactory, as it is, the most salutary, of the charities of the State.

Dated January 5, 1904.

CHARLES McLOUTH,
ELLERY G. ALLEN,
RICHARD P. GROAT,
GEORGE O. BAKER,
GERTRUDE A. MOSS,
E. K. BURNHAM,
Managers.

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